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OF

NORTH AMERICAN GEOLOGY

FOR

1915

WITH SUBJECT INDEX

BY

JOHN M. NICKLES



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CONTENTS.

	Page.
Introduction.....	3
Serials examined.....	4
Bibliography.....	9
Outline of subject headings.....	86
Index.....	89
Lists.....	125
Chemical analyses.....	126
Minerals described.....	126
Rocks described.....	126
Geologic formations described.....	126

BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY FOR 1915, WITH SUBJECT INDEX.

By JOHN M. NICKLES.

INTRODUCTION.

The bibliography of North American geology, including paleontology, petrology, and mineralogy, for the year 1915 follows the plan and arrangement of its immediate predecessors. It includes publications bearing on the geology of the Continent of North America and adjoining islands; also Panama and the Hawaiian Islands. Papers by American writers on the geology of other parts of the world are not included. Textbooks and papers general in character by American authors are included; those by foreign authors are excluded unless they appear in American publications.

As heretofore, the papers, with full title and medium of publication and explanatory note when the title is not fully self-explanatory, are listed under the authors, arranged in alphabetic order. The author list is followed by an index to the literature listed. In this index the entries in one alphabet are of three kinds—first, subject, with various subdivisions, to enable the specialist to ascertain readily all the papers bearing on a particular subject or area; second, titles of papers, many of them abbreviated or inverted, under their leading words; and third, cross references, which have been freely used to avoid too much repetition. The subjects have been printed in black-faced type, the titles of papers and cross references in ordinary type. As it may not be always obvious which subject headings have been adopted, an outline of those used immediately precedes the index.

Miss Isabel P. Evans has given efficient assistance in the work.

The bibliography of North American geology is comprised in the following bulletins of the United States Geological Survey: No. 127 (1732–1892); Nos. 188 and 189 (1892–1900); No. 301 (1901–1905); No. 372 (1906–7); No. 409 (1908); No. 444 (1909); No. 495 (1910); No. 524 (1911); No. 545 (1912); No. 584 (1913); No. 617 (1914); and No. 645 (1915).

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OUTLINE OF SUBJECT HEADINGS.

In the following index the subject headings are printed in black-faced type. An outline of these is here given that it may be quickly seen which subject heading of two or more synonyms has been adopted. Thus "petroleum" and not "oil" nor "rock oil" has been chosen. That the specialist may see at a glance under what headings to find cognate literature, subject headings that are more or less closely related have been grouped together under the following heads: Areal or regional, general, economic, dynamic and structural, physiographic, stratigraphic or historical, paleontology, petrology, mineralogy, underground water. In the index the specific entries under the areal or regional subject headings are alphabetized under these same heads arranged in the same order, namely, general, economic, etc.

AREAL OR REGIONAL.

The States and Territories of the Union, Alabama, Alaska, etc.; The Provinces of Canada, Alberta, etc.; Greenland; Arctic regions; Mexico; the countries of Central America; the West Indies, and the single islands; the Hawaiian Islands.

GENERAL.

Associations, meetings; Addresses; Philosophy; History; Biography; Bibliography; Education; Textbooks.

Surveys; Fieldwork; Excursions; Technique; Cartography.

Classification; Nomenclature.

Geochemistry; Chemical analyses (list); Geophysics; Atmosphere; Radioactivity.

Experimental investigations; Borings; Miscellaneous.

ECONOMIC.

Ore deposits, origin; Contact phenomena.

Gold; Placers; Black sands; Silver; Quicksilver; Nickel; Cobalt; Copper; Lead; Zinc; Iron; Magnetite; Manganese; Tin.

Aluminum; Bauxite; Antimony; Bismuth; Tungsten; Vanadium; Uranium; Carnotite ores; Molybdenum; Chromic iron ore.

Platinum; Palladium; Titanium; Rutile; Rare earths; Monazite; Zircon.

Coal; Anthracite; Lignite; Peat.

Petroleum; Natural gas; Oil shales; Asphalt; Albertite; Gilsonite; Bituminous rock.

Stone; Building stone; Granite; Trap; Bluestone; Limestone; Marble; Lime; Gypsum.

Sand; Glass sand; Silica; Quartz; Quartzite; Sandstone; Gravel; Cement and cement materials; Concrete materials; Road materials.

Clay; Kaolin; Bentonite; Fire clay; Ganister; Slate; Shale; Pyrophyllite.

Serpentine; Asbestos; Steatite; Soapstone; Talc.

Precious stones; Diamonds; Sapphires; Turquoise; Tourmaline; Onyx.

Abrasive materials; Corundum; Emery; Garnet; Diatomaceous earth; Tripoli; Volcanic ash; Pumice; Millstones; Whetstones; Novaculite; Feldspar.

Phosphate; Apatite; Potash; Alunite; Nitrate; Glauconite; Marl.
 Salt; Salines; Bromine; Calcium chloride; Borax; Fluorspar.
 Barite; Strontium; Mineral paints.
 Arsenic; Fuller's earth; Infusorial earth; Magnesite; Mica; Graphite.
 Phosphorus; Sulphur; Pyrite.
 Soils.

DYNAMIC AND STRUCTURAL.

Earth, genesis of; Earth, age of; Earth, interior of; Earth, temperature of.
 Volcanism; Volcanoes; Earthquakes; Seismology; Seismographs; Mud volcanoes.
 Isostasy; Orogeny; Changes of level.
 Magmas; Magmatic differentiation; Laccoliths; Intrusions; Dikes; Contact phenomena.
 Deformation; Folding; Faulting; Unconformities.
 Conglomerates; Concretions; Stalactites; Jointing; Cleavage.
 Denudation; Erosion; Coast changes; Coral islands and reefs; Weathering; Caves;
 Sink holes; Wind work; Dunes; Loess; Landslides.
 Glaciers; Glacial erosion; Glacial striæ; Potholes; Kettle holes.
 Sedimentation; Eskers; Kames; Moraines.
 Drainage changes.

PHYSIOGRAPHIC.

Geomorphy; Relief maps.
 Plains; Prairies; Penepains; Valleys; Cirques; Deserts; Alluvial fans; Deltas;
 Mounds, natural; Sink holes; Karsts; Natural bridges.
 Rivers; Stream piracy; Meanders; Falls; Lakes; Swamps; Marshes; Everglades.
 Terraces; Beaches; Shore lines.

STRATIGRAPHIC OR HISTORICAL.

Geologic history; Geologic time; Paleogeography; Paleogeographic maps; Paleoclimatology.
 Geologic maps; Geologic formations described (list); Tables of formations; Unconformities; Borings.
 Pre-Cambrian; Paleozoic (undifferentiated); Cambrian; Ordovician; Silurian; Devonian; Carboniferous; Mesozoic (undifferentiated); Triassic; Jurassic; Cretaceous; Tertiary; Quaternary; Recent.
 Glacial geology; Glaciation; Drift deposits; Glacial lakes; Erratic boulders; Ice ages (ancient).

PALEONTOLOGY.

Geographic distribution; Evolution; Restorations.
 Vertebrata; Man, fossil; Mammalia; Aves; Reptilia; Amphibia; Pisces; Footprints.
 Invertebrata; Arthropoda; Crustacea; Trilobita; Ostracoda; Insecta; Arachnida; Myriapoda.
 Mollusca; Cephalopoda; Gastropoda; Pelecypoda.
 Molluscoidea; Brachiozoa; Radiata; Echinodermata; Coelenterata; Spongia.

PETROLOGY.

Rocks, origin; Rocks, structural features; Rocks described (list); Igneous and volcanic rocks; Rock-forming minerals; Lava; Oolite; Dolomite; Pebbles.

MINERALOGY.

Minerals described (list); Crystallography; Pseudomorphism; Paragenesis of minerals; Rock-forming minerals; Meteorites.

UNDERGROUND WATER.

Mineral waters; Thermal waters; Geysers; Springs; Mine waters.

INDEX.

[The numbers refer to entries in the bibliography.]

Abstracts.

United States: Katz, 614.

Addresses.

Isotasy and radioactivity: Becker, 88.
 Relief of our Pacific coast: Diller, 352.
 Seismology, progress and needs: McAle, 719.

Alabama.

General.

Survey, report 1910-4: Smith, 1007.

Economic.

Barite: Watson and Grasty, 1148.
 Marbles, crystalline: Prouty, 904.
 Mineral production, 1914: Smith, 1008.

Stratigraphic.

Cretaceous-Eocene contact: Stephenson, 1039.

Alaska.

Economic.

General: Brooks, 146.
 Broad Pass region: Moffit and Pogue, 812.
 Chisana-White River district: Capps, 198.
 Coal, Chignik Bay: Crane, 275.
 Copper, Copper Mountain: Wright, 1209.
 Ellamar district: Capps and Johnson, 203.
 Kasaa Peninsula: Wright, 1209.
 Kotsina-Kuskulana district: Mertie, 799.
 Port Valdez district: Johnson, 586.
 Prince William Sound: Johnson, 585.
 Russian Mountains: Maddren, 748.

Ellamar district: Capps and Johnson, 203.

Fairbanks district: Eakin, 385.

Gold: Brooks, 147.

Chisana field: Cairnes, 189.
 Chisana-White River district: Capps, 198.
 Fairbanks district: Eakin, 385.
 Hot Springs district: Eakin, 386.
 Juneau region: Eakin, 384.
 Kuskokwim region: Maddren, 748.
 Nelchina-Susitna region: Chapin, 215.
 Port Valdez district: Johnson, 586.
 Prince William Sound: Johnson, 585.
 Seward Peninsula: Eakin, 388.
 Shushana district: Ellis, 304.
 Willow Creek district: Capps, 197.

Gold, silver, and copper, 1914: Brooks, 148.

Hot Springs district: Eakin, 386.

Iron, Nome: Eakin, 387.

Juneau region: Eakin, 384; Hyder, 574.

Kenai Peninsula: Martin *et al.*, 757.

Kotsina-Kuskulana district: Mertie, 799; Moffit, 811.

Kuskokwim region: Maddren, 748.

Lake Clark-Iditarod region: Smith, 1013.

Lignite, Cook Inlet and Kachemak Bay region: Crane, 274.

Kachemak Bay: Parks, 863.

Alaska—Continued.

Economic—Continued.

Petroleum fields: Brooks, 145.
 Placers, Yakutatga beach: Thompson, 1006.
 Port Valdez district: Johnson, 586.
 Prince William Sound: Johnson, 585.
 Quicksilver, Kuskokwim region: Smith and Maddren, 1014.

Shushana district: Ellis, 304.

Tin: Eakin, 383.

Yakutatga beach placers: Thompson, 1006.

Dynamic and structural.

Ellipsoidal lavas, Prince William Sound, Alaska: Capps, 199.

Flords, filling: Martin, 759.

Glaciers: Martin, 758.

southeastern Alaska: Martin, 761.

Ground-ice wedges, north coast: Leffingwell, 676.

Thrust fault, Nizina River: Capps, 202.

Physiographic.

Flords, southeastern Alaska: Williams, 1187.

Glacial stages: Capps, 200.

Glaciation, age: Capps, 201.

Stratigraphic.

Broad Pass region: Moffit and Pogue, 812.

Cantwell formation, Alaska Range: Pogue, 886.

Chisana-White River district: Capps, 198.

Copper Mountain: Wright, 1209.

Ellamar district: Capps and Johnson, 203.

Ellipsoidal lavas, Prince William Sound, Alaska: Capps, 199.

Glacial stages: Capps, 200.

Glaciation, Broad Pass region: Moffit and Pogue, 812.

Gravina Island: Smith, 1012.

Kachemak Bay: Parks, 863.

Kasaa Peninsula: Wright, 1209.

Kenai Peninsula: Martin *et al.*, 757.

Kotsina-Kuskulana district: Moffit, 811.

Kuskokwim region: Smith and Maddren, 1014.

Lake Clark-Iditarod region: Smith, 1013.

Nelchina-Susitna region: Chapin, 215.

Port Valdez district: Johnson, 586.

Volcanic ash layer, Yukon basin: Capps, 196.

Willow Creek district: Capps, 197.

Alberta.

General.

Foothills region: Rose, 949.

Foothills region: Stewart, 1050.

Lake Athabasca region: Alcock, 5.

Rocky Mountains Park: Allan, 7.

Sheep River area: Slipper, 1003.

Alberta—Continued.**Economic.**

- Calgary gas and oil field: Slipper, 1004.
 Clay: Keele, 619; Ries, 935.
 McMurray: Ellis, 395.
 Coal, Drumheller field: Macaulay, 720.
 Gold, North Saskatchewan River: Tyrrell, 1090.
 Oil fields, correlation and structure: Dowling, 368.
 prospective: Cunningham-Craig, 267.
 Petroleum: Dowling, 368, 369.
 Calgary field: Slipper, 1004.
 southern Alberta: Dowling, 367.
 Phosphate, Banff district: Adams and Dick, 3.
 Shale: Keele, 619; Ries, 935.
 Southern Alberta: Dowling, 371.

Stratigraphic.

- General: Adams and Dick, 3; Cunningham-Craig, 267.
 Banff district: Adams and Dick, 3.
 Borings: Huntley, 568.
 Cretaceous: Dowling, 370.
 Cretaceous, Crownsnest River: McLearn, 743.
 North Saskatchewan River: Tyrrell, 1090.
 Oil fields, correlation and structure: Dowling, 368.
 southern Alberta: Dowling, 367.
 Southern Alberta: Dowling, 371.

Paleontology.

- Dinosauria: Lambe, 664.

Petrology.

- Analcite, Crownsnest volcanics: MacKenzie, 738.

Alexandrian series: Keyes, 631.

Algal reef, Teton Mountains: Blackwelder, 109.

Algae.

- Eocene: Davis, 316.
 Green River formation: Davis, 313.
 Occurrence in carbonaceous deposits: Davis, 314, 315.
 Panama Canal Zone: Howe, 560.
 Pre-Paleozoic: Walcott, 1128.
 Wyoming, Teton Mountains: Blackwelder, 109.

Algonkian. *See* Pre-Cambrian.

Algonkian bacteria: Walcott, 1125.

Allosaurus fragilis: Gilmore, 443.

Aluminum.

- United States: Phalen, 873.

Alunite.

- British Columbia, Kyuquot Sound: Clapp, 217.

Ammonites. *See* Cephalopoda.

Amphibia.

- General: Moodie, 819.
 Coal Measures: Moodie, 820.
 Crocotus, distribution: Case, 209.
 Derivation: Moodie, 820.
 Geographic distribution: Moodie, 818.
 Ichthyacanthus: Moodie, 817.
 Ichthyacanthus platypus, Coal Measures, Ohio: Moodie, 814.
 List of described species: Moodie, 813.
 Methods of study: Moodie, 821.
 Scaled Amphibia, coal measures: Moodie, 816.
 Tetrapoda, origin: Gregory, 474.
 Trimerorhachis: Williston, 1195.

Analyses, chemical. *See* list, p. 125.

Anamorphism: Leith and Mead, 683.

Anmikia. *See* Pre-Cambrian.

Anthozoa (corals).

Evolution: Brown, 153.

Rugosa: Brown, 152.

Anticyclones above continental glaciers: Hobbs, 534.

Antigua.**Stratigraphic.**

General: Vaughan, 1115.

Underground water.

General: Vaughan, 1115.

Antilles.**Stratigraphic.**

Cretaceous and Tertiary: Vaughan, 1113.

Arachnida.

Eurypterus, Nebraska: Barbour, 52.

Archean. *See also* Pre-Cambrian.

Georgia, northern: Galpin, 429.

Arctic regions.**Stratigraphic.**

Coast: O'Neill, 849.

Ellesmere Land region: Schel, 959.

Paleontology.

Tertiary plants, Ellesmere Land: Nathorst, 836.

Mineralogy.

Baffin Land: Walker, 1127.

Arizona.**Economic.**

- Asbestos: Joseph, 610.
 Bisbee: De Wilde, 346.
 Copper, Bisbee: De Wilde, 347.
 Kofa Mountains: Jones, 602.
 Directory of minerals: Willis, 1192.
 Gold, Kofa Mountains: Jones, 602.
 Quartzsite: Jones, 601.
 Gold placers: McClure, 724.
 Gold Road district, Kingman: Banoroff, 41.
 Kofa Mountains: Jones, 602.
 Manganese: Joseph, 608.
 Mineral production, 1914: Helkes, 503.
 Mineral resources: Willis, 1193.
 Molybdenum: Joseph, 609.
 Patagonia Mountains: Schrader, 964.
 Quicksilver, Mazatzal Range: Ransome, 908.
 Santa Rita and Patagonia Mountains: Schrader, 964.

Dynamic and structural.

Glacial deposits, so-called, Navajo Reservation: Gregory, 472.

Physiographic.

Bajadas, Santa Catalina Mountains: Tolman, 1071.

Meteor Crater: Barringer, 74.

Navajo country: Gregory, 473.

Stratigraphic.

Glacial deposits, so-called, Navajo Reservation: Gregory, 472.

Kofa Mountains: Jones, 602.

Mazatzal Range: Ransome, 908.

Patagonia Mountains: Schrader, 964.

Ray quadrangle: Ransome, 909.

Santa Rita Mountains: Schrader, 964.

Arizona—Continued.**Paleontology.**

- Gastropoda, Mesozoic: Robinson, 940.
Triassic Reptilia: Mehl, 780.

Petrology.

- Patagonia Mountains: Schrader, 964.
Santa Rita Mountains: Schrader, 964.
Sulphide-bearing monsonite: Schrader, 966.

Mineralogy.

- Connellite, Bisbee: Ford and Bradley, 419.
Directory of minerals: Willis, 1192.
Patagonia Mountains: Schrader, 964.
Santa Rita Mountains: Schrader, 964.
Shattuckite and bisbeeite: Schaller, 957.

Underground water.

- Paradise Valley: Meinzer and Ellis, 783.

Arkansas.**Economic.**

- Bauxite: Mead, 776.

Stratigraphic.

- Batesville district: Girty, 450.
Batesville sandstone, northern Arkansas: Girty, 449.
Boone limestone, St. Joe: Girty, 451.
Morrow group: Mather, 763.

Paleontology.

- Batesville sandstone fauna: Girty, 449.
Boone chert fauna, Batesville: Girty, 450.
Boone limestone fauna, St. Joe: Girty, 451.
Morrow group fauna: Mather, 763.

Artesian waters and wells. *See* Underground water.

Asbestos.

- General: Joseph, 610.
United States: Diller, 356.

Asphalt. *See also* Grahamsite.

- General: Richardson, 930.
United States: Northrop, 844.

Associations, meetings.

- Geological Society of America, California meeting, August, 1915: Hovey, 556; Taff, 1056.
Cordilleran section, 1914: Louderback, 699.
Philadelphia meeting, 1914: Hovey, 554, 555.
Paleontological Society, California meeting, 1915: Stock, 1052.
Pacific coast section, fifth annual meeting: Waring, 1133.
Philadelphia, 1914: Bassler, 78.

Asteroides.

- Stelleroides, Paleozoic: Schuchert, 970.

Aves (birds).

- Gallinuloides wyomingensis: Shufeldt, 996.
Hesperornis, Montana: Shufeldt, 995.
Hesperornis regalis: Shufeldt, 997.
Marsh collection: Shufeldt, 994.

- Bacteria, Algonkian: Walcott, 1125.

- Bacteria, iron: Harder, 439.

Barite.

- Appalachian States: Watson and Grasty, 1148.
Kentucky, Franklin County: Miller, 802.

Bathyliths. *See* Intrusions.

Batrachia. *See* Amphibia.

Bauxite.

- Arkansas: Mead, 776.
Georgia, central: Watkins, 1143.
United States: Phalen, 873.

Beaches. *See also* Shore lines; Terraces.

- Indiana: Leverett and Taylor, 686.
Michigan: Leverett and Taylor, 686.

Belleville-Breese folio, Illinois (no. 195): Udden and Shaw, 1097.

Bibliography.

- Aluminum: Phalen, 873.
Arizona, southern: Schrader, 964.
Barite: Watson and Grasty, 1148.
Barytes: Hill, 523.
Barlow, A. E., writings: Adams, 2.
Bauxite: Phalen, 873.
Broadhead, G. C., writings: Greger, 469.
Connecticut Valley Triassic area: Lull, 712.
Corundum: Barlow, 68.
Echinodermata: Clark and Twitchell, 225.
Economic geology: Paige, 858.
Fuel oil: Phillips, 880.
Glacial geology, Great Lakes region: Leverett and Taylor, 686.
Graphite: Bastin, 82.
Hovey, H. C., writings: Clarke, 235.
Lance formation, Niobrara County, Wyoming: Lull, 715.
Le Conte, Joseph, writings: Fairchild, 402.
McGee, W. J., writings: McGee, 733.
Minnesota: Gregory, 479.
Nebraska, Survey publications: Barbour, 43.
Notharctus and Lemuroidea: Gregory, 475.
Oklahoma: Trout and Myers, 1077.
Ontario, Devonian: Stauffer, 1035.
Petroleum, Mexico: Stewart, 1051.
Phosphate, Florida: Matson, 764.
Porto Rico: Berkeley, 96.
Pre-Cambrian literature: Steldtmann, 1037.
Quebec, copper: Bancroft, 42.
Salt: Phalen, 874.
Tarr, R. S., writings: Martin, 760.
Turquoise: Pogue, 887.
Winchell, N. H., writings: Upham, 1099.

Biography.

- Barlow, A. E.: Adams, 2.
Broadhead, G. C.: Greger, 469.
Dana, J. D.: Rice, 923; Schuchert, 968.
Holmes, J. A.: Anon, 1226.
Hovey, H. C.: Clarke, 235.
Le Conte, Joseph: Fairchild, 402.
Lesley, Peter: Davis, 325.
McGee, W. J.: Darton, 307; McGee, 733.
Powell, J. W.: Davis, 324.
Tarr, R. S.: Brigham, 139; Martin, 760.
Winchell, N. H.: Upham, 1099.

Birds. *See* Aves.

Bituminous rock.

- Black shale problem: Grabau, 466.
 Block diagrams: Lobeck, 697.
 Blowing wells. *See* Underground water.
 Bog iron-ore deposits, formation and distribution: Dake, 297.
 Bolsons: Tolman *et al.*, 1073.
Borax.
 California: Yale and Gale, 1219.
 United States: Yale and Gale, 1219.
Borings.
 Alberta: Huntley, 568.
 Canada: Ingall, 575.
 Illinois: Cady, 186; Kay, 615; Udden, 1093.
 Bond, Macoupin, and Montgomery cos.: Blatchley, 112.
 Danville district: Kay and White, 616.
 Kansas: Haworth, 466.
 Elmdale: Smith, 1005.
 Missouri: McCoy, 727.
 Oklahoma, southern: Wegemann, 1156.
 Ontario: Malcolm, 750.
 Quebec: Malcolm, 750.
 Texas, northwestern: Udden, 1094.
 West Virginia, Boone Co.: Krebs and Teets, 659.
 Logan Co.: Hennen and Reger, 511.
 Mingo Co.: Hennen and Reger, 511.
 Botany, fossil. *See* Paleobotany.
 Bottom currents: Kindle, 645.
 Boulder batholith, Montana: Billingsley, 105.
 Bowlders in coal beds: White, 1183.
Brachiopoda.
 Composition of shell: Clarke and Wheeler, 228.
 Manitoba, Saskatchewan River valley: Kindle, 643.
 Spirifer mucronatus, variation: Mook, 824.
 Brandywine formation, Atlantic Coastal Plain: Clark, 224.
 Breccia. *See* Rock structures.
British Columbia.
 General.
 Flathead area: MacKenzie, 737.
 Oil possibilities: Tyrrell, 1092.
 Economic.
 General: Robertson, 937.
 Ainsworth camp: Schofield, 963.
 Alunite and pyrophyllite, Kyuquot Sound: Clapp 217.
 Atlin mining division: Brewer, 136.
 Beaverdell area: Reinecke, 920.
 Bureau of Mines report: Robertson, 937.
 Clay: Ries, 935.
 Coal fields: Dowling, 365.
 Copper, Similkameen district: Keffer, 620.
 Cranbrook area: Schofield, 962.
 Franklin mining camp, West Kootenay: Drysdale, 374.
 Graham Island: MacKenzie, 736.
 Grand Forks mining division: Larson, 669.
 Kettle River region: Larson, 669.
 Lake region: Lakes, 663.
 Lardeau mining division: Emmens, 400.
 Mineral production, 1914: Robertson, 938.
 Molybdenite, Lost Creek: Drysdale, 373.
 Oil fields, prospective: Cunningham-Craig, 287.

British Columbia—Continued.

- Economic—Continued.*
 Oil possibilities: Tyrrell, 1092.
 Omineca mining division: Brewer, 137, 138; Galloway, 428.
 Rossland: Drysdale, 375.
 Shale: Ries, 935.
 Silver-lead, Cranbrook area: Schofield, 962.
 Skeena mining division: Brewer, 137.
 Trout Lake mining division: Emmens, 400.
 Ymir camp, West Kootenay: Drysdale, 376.
Dynamic and structural.
 Contact metamorphism, Pass Creek: Brock, 144.
 granite to garnet: Brock, 143.
 Deformation of coast region: Clapp, 218.
 Glaciers, motion: Vaux, 1117, 1118.
 Robson Glacier: Wheeler, 1174.
 Yoho Glacier: Wheeler, 1171-1173.
Physiographic.
 Beaverdell area: Reinecke, 921.
 Franklin mining camp, West Kootenay: Drysdale, 374.
Stratigraphic.
 Coal fields: Dowling, 365.
 Cranbrook area: Schofield, 962.
 Franklin mining camp, West Kootenay: Drysdale, 374.
 Golden-Kamloops: Daly, 302.
 Graham Island: MacKenzie, 736.
 Rossland: Drysdale, 375.
 Sedimentation conditions in Cambrian: Burling, 165.
 Selkirk Mountains: Burwash, 169; Coleman, 250.
Paleontology.
 Cranbrook area: Schofield, 962.
 Ficus, interglacial, Kootenay Valley, British Columbia: Hollick, 542, 543.
Petrology.
 Beaverdell area: Reinecke, 920.
 Cranbrook area: Schofield, 962.
 Franklin mining camp, West Kootenay: Drysdale, 374.
 Garnet, altered from granite: Brock, 143.
Mineralogy.
 General: Brock, 142.
 Beaverdell area: Reinecke, 920.
 Rossland: Drysdale, 375.
Bromine.
 United States: Phalen, 874.
Bryozoa.
 Monticulporoidea, structure: Cumings and Galloway, 285.
 Trepostomata, structure: Cumings and Galloway, 285.
 Broad Pass region, Alaska: Moffit and Pogue, 812.
Building stone. *See also* Granite; Limestone; Sandstone; Stone.
 Nova Scotia, Halifax, iron stone: Vickery, 1119.
 Ohio: Bownocker, 126.
 United States: Loughlin, 707.
 Burning of coal beds in place: Bowle, 125.
 Calcite, solubility in water: Wells, 1169.
 Calcium carbonate deposition and bacteria: Kellerman, 621.

Calcium chloride.

United States: Phalen, 874.

California.**Economic.**

Amador County: Tucker, 1082.
 Calaveras County: Tucker, 1082.
 Colusa County: Bradley, 128.
 Del Norte County: Lowell, 710.
 Fresno County: Bradley, 129.
 Glenn County: Bradley, 128.
 Gold, pocket deposits, Klamath Mountains:
 Ferguson, 409.

Seneca district: Wright, 1216.
 Humboldt County: Lowell, 710; Stalder, 1030.
 Eel River valley: Harmon, 491.
 Kern County: Brown, 151.
 Kings County: Bradley, 129.
 Lake County: Bradley, 128.
 Madera County: McLaughlin and Bradley,
 740.

Marin County: Bradley, 128.
 Mariposa County: Lowell, 711.
 Masonic district, Mono County: McLaughlin,
 739.

Mendocino County: Lowell, 710.
 Mineral production, 1913: Boalich, 113.
 1914: Hamilton, 485; Yale, 1218.
 Napa County: Bradley, 128.
 Northeastern California: Hill, 520.
 Petroleum: Arnold, 27; Anderson and Pack, 21.
 Santa Maria district: Prutzman, 905.
 South Mountain field, Ventura County:
 Hager, 482.

San Joaquin County: Lowell, 711.
 San Joaquin Valley (west border): Anderson
 and Pack, 21.

Seneca district: Wright, 1216.
 Shasta County: Brown, 150.
 Shastiyou County: Brown, 150.
 Solano County: Bradley, 128.
 Sonoma County: Bradley, 128.
 Stanislaus County: Lowell, 711.
 Tuolumne County: Tucker, 1082.
 Trinity County: Brown, 150.
 Yolo County: Bradley, 128.

Dynamic and structural.

Earthquake, Imperial Valley, June 22, 1915:
 Beal, 87.

Los Alamos, Santa Barbara County: Beal, 86.
 November 8, 1914, central California: Davis,
 319.

October 7, 1915: Davis, 320.
 registration, Oct. 1, 1914, to Mar. 31, 1915:
 Davis, 318.

Heave-fault slipping, cause: Wood, 1206.
 Imperial Valley: Beal, 87.
 Lassen Peak: Holway, 546; Turner, 1084.
 eruption: Boerker, 116; eruptions: Diller, 351;
 Holway and Diller, 546.
 Mount Shasta: Diller, 353.
 Sierra, mountain sculpture: Muir, 831.
 Sierra Nevada, southern, structure: Buwalda,
 183.

Physiographic.

Blake Sea, travertine record: MacDougal and
 Sykes, 732.
 Colorado Desert: Blake, 111.

California—Continued.**Physiographic—Continued.**

Death Valley: Hubbard, 561.
 Glacial cirques, Sierra Nevada: Matthes, 766.
 Imperial Valley: Beal, 87.
 Lake Calhulla: Blake, 111.
 Mount Shasta: Diller, 353.
 Salton Sea: MacDougal, 731.
 Salton Sink: Blake, 111.
 Sand dunes, Monterey: Campbell, 192.
 Sierra, mountain sculpture: Muir, 831.

Stratigraphic.

Alameda Creek basin: Clark, 223.
 Humboldt Co.: Stalder, 1030.
 Eel River valley: Harmon, 491.
 Ione formation, Sierra Nevada foothills: Dick-
 erson, 349.
 Iron Mountain, Shasta County: Hershey, 514.
 Klamath Mountains: Ferguson, 409.
 Mohave Desert: Merriam, 787.
 Mount Shasta: Diller, 353.
 North Coalinga region: Merriam, 788.
 Northeastern California: Hill, 520.
 Oligocene, Contra Costa hills: Clark, 221.
 San Joaquin Valley (west border): Anderson
 and Pack, 21.
 San Pablo group, California: Clark, 220.
 Santa Ynez River district, Santa Barbara
 County: Kew, 630.
 Sierra Nevada, southern, structure: Buwalda,
 183.

Tejon group: Dickerson, 348.
 Tejon Hills: Merriam, 789.
 Tertiary correlation, southern California: Mer-
 riam, 793.

Paleontology.

Echinoids, San Pablo group: Kew, 629.
 Hipparion group: Merriam, 791.
 Horses, Miocene and Pliocene, California: Mer-
 riam, 792.
 Mammalia, Tejon Hills: Merriam, 789.
 Mohave Desert: Merriam, 787.
 North Coalinga region, vertebrates: Merriam,
 788.

Rissoina: Bartsch, 75.
 San Pablo fauna, California: Clark, 220.
 Tejon fauna: Dickerson, 348.

Mineralogy.

Albite, manganiferous: Kraus and Hunt, 668.
 Lawsonite, Marin County: Rogers, 943.

Underground water.

Niles area, ground water: Clark, 223.
 Sacramento Valley: Bryan, 156.
 Springs: Waring, 1134.

Cambrian.**Stratigraphy.**

General: Walcott, 1124.
 Arizona, Ray quadrangle: Ransome, 909.
 Santa Rita and Patagonia Mountains: Schra-
 der, 964.
 British Columbia, Golden-Kamloops: Daly,
 302.
 Selkirk Mountains: Burwash, 169.
 Colorado, Castle Rock quadrangle: Richardson,
 931.
 Red Cliff region: Means, 777.
 Cordilleran region: Walcott, 1124.

Cambrian—Continued.**Stratigraphy—Continued.**

- Montana, Phillipsburg quadrangle: Calkins and Emmons, 190.
 Newfoundland, Conception and Trinity bays: Dale, 298.
 New Jersey: Lewis and Kummel, 687.
 Oklahoma: Wallis, 1130.
 Quebec, Brome and Missisquoi counties: Harvie, 493.
 Sedimentation conditions in Cambrian: Burling, 165.
 Utah, Cottonwood-American Fork region: Butler and Loughlin, 178.
 Virginia, James River Gap: Watson and Cline, 1146.

Paleontology.

- General: Walcott, 1124.
 Algal reef, Teton Mountains: Blackwelder, 109.

Canada (general). See also names of provinces.**General.**

- General: Aml, 16. Merciai, 785.
 Borings: Ingall, 575.
 Mackenzie River region: Camself, 195.
 National parks: Allan, 6.
 Report of Survey, 1914: McConnell, 725.

Economic.

- Coal resources: Dowling, 366.
 Corundum: Barlow, 68.
 Gold, pre-Cambrian: Tyrrell, 1087.
 Mineral production, 1913: McLelsh, 746.
 Molybdenite: Smith, 1016.
 Natural gas: Clapp *et al.*, 219.
 Petroleum: Clapp *et al.*, 219.
 Radioactive minerals, eastern Canada: Robinson, 939.
 Salt: Cole, 249.

Stratigraphic.

- General: Kindle, 644.
 Canadian shield, Archeozoic: Adams, 1.
 Canadian shield, Proterozoic: Coleman, 252.
 Pre-Cambrian: Tyrrell, 1087.

Paleontology.

- General: Kindle, 644.
 Paleobotany: Wilson, 1199.
 Report on Vertebrata: Lambe, 665.

Mineralogy.

- General: Johnston, 597.
 Occurrence: Johnston, 596.
 Radioactive minerals, eastern Canada: Robinson, 939.

Canal Zone. See Panama.**Cantwell formation, Alaska Range: Pogue, 886.****Carboniferous.****Stratigraphy.**

- Arkansas, Boone limestone: Girty, 451.
 Morrow group: Mather, 763.
 Arizona, Ray quadrangle: Ransome, 909.
 Santa Rita and Patagonia Mountains: Schrader, 964.
 Berea grit, base: Cushing, 294.
 British Columbia, Cranbrook area: Schofield, 962.
 Franklin mining camp, West Kootenay: Drysdale, 374.
 Golden-Kamloops: Daly, 302.
 Roseland: Drysdale, 375.

Carboniferous—Continued.**Stratigraphy—Continued.**

- Castile gypsum and Rustler formation, age: Udden, 1095.
 Chattanooga series, Kinderhook age: Ulrich, 1098.
 Colorado Castle Rock quadrangle: Richardson, 931.
 North Park: Beekly, 92.
 Red Cliff, region: Means, 777.
 Illinois: Cady, 186; Kay, 615.
 Belleville and Breese quadrangles: Udden and Shaw, 1097.
 Bond, Macoupin, and Montgomery counties: Blatchley, 112.
 Danville district: Kay and White, 616.
 Gillespie and Mt. Olive quadrangles: Lee, 672.
 Schuyler and Brown counties: Morse and Kay, 828.
 Indiana, Bloomington quadrangle: Beede *et al.*, 91.
 Flatwoods region, Owen and Monroe counties: Malott, 751.
 Kentucky, Clay and Knox counties: Hodge, 537.
 Drakesboro quadrangle: Crider, 277.
 Dummor quadrangle: Crider, 278.
 Jefferson County: Butts, 182.
 Little Muddy quadrangle: Crider, 279.
 Nortonville quadrangle: Crider, 276.
 Perry County: Hodge, 536, 538.
 Mississippi: Lowe, 709.
 Missouri, Pennsylvanian series: Hinds and Greene, 529.
 Montana, Phillipsburg quadrangle: Calkins and Emmons, 190.
 Nebraska, Pennsylvanian formations: Condra and Bengtson, 258.
 New Mexico, Tularosa Basin: Mainzer and Hare, 784.
 Nova Scotia: Hyde, 572.
 Ohio: Bownocker, 126.
 Columbus quadrangle: Hubbard *et al.*, 562.
 Waverly: Hyde, 573.
 Oklahoma: Shannon and Trout, 963; Wallis, 1130.
 Morrow group: Mather, 763.
 northeastern: Snider, 1019.
 southern: Wegeman, 1156-1158.
 Ozark uplift: Siebenthal, 999.
 Permo-Carboniferous red beds: Case, 206.
 Tennessee, Scott County: Glenn, 455.
 Texas: Richard, 928.
 Llano Estacado, northern: Baker, 83.
 Palo Pinto County: Wegemann, 1159.
 Utah, Cottonwood-American Fork region: Butler and Loughlin, 178.
 Wapanucka limestone, Oklahoma: Wallis, 1130.
 West Virginia, Boone County: Krebs and Teets, 659.
 Logan County: Hennen and Reger, 468.
 Mingo County: Hennen and Reger, 511.
 Wyoming and McDowell counties: Hennen and Gawthrop, 510.
 Yukon, upper White River district: Cairnes, 187.

Carboniferous—Continued.

Paleontology.

- General: Mather, 763.
- Arkansas, Batesville fauna: Girty, 449.
- Boone chert fauna: Girty, 450.
- Boone limestone: Girty, 451.
- Morrow group: Mather, 763.
- Indiana, Bloomington quadrangle, flora: Jackson, 577.
- Missouri: Girty, 452.
- Oklahoma, Chester group: Snider, 1020.
- Morrow group: Mather, 763.
- Permian-Carboniferous vertebrates: Case, 206.
- Wewoka fauna, Oklahoma: Girty, 448.
- West Virginia, Boone County: Price, 902.
- Castile gypsum and Rustler formation, Texas, age: Udden, 1095.
- Castle Rock folio, Colorado (no. 198): Richardson, 931.
- Garnetiferous ores.**
- General: Kennan, 626.
- Cartography.** *See* Maps.
- Catahoula sandstone, Texas, origin: Goldman, 456.
- Catskill Mountains, origin: Clarke, 233.
- Cement and cement materials.**
- Nebraska: Barbour, 49.
- United States: Burchard, 162.
- Central America. *See* Costa Rica; Guatemala, etc.
- Cephalopoda.** *See also* Mollusca.
- Trochoceras grovianense*: Mook, 825.
- Cetacea.** *See* Mammalia.
- Chalcocite occurrence:** Graton *et al.*, 468.
- Changes of level.** *See also* Beaches; Shore lines; Terraces.
- General: Vaughan *et al.*, 1116.
- Change in ocean volume: Humphreys, 567.
- Maine, coast subsidence: Davis, 312.
- Pleistocene and Recent: Barrell, 71.
- Strand line movements: Barrell, 71.
- Chattanooga series, Kinderhook age: Ulrich, 1098.
- Chemical analyses.** *See* list, p. 125.
- Chestnut Ridge disturbance: Gardner, 430.
- Chromite from ore.**
- California: Diller, 355.
- United States: Diller, 355.
- Cirques.**
- California, Sierra Nevada: Matthes, 766.
- Cirques and U-shaped mountain valleys: Coleman, 251.
- Classification.**
- Clay: Butler, 180.

Clay—Continued.

- Alberta: Keele, 619; Ries, 935.
- McMurray: Ellis, 395.
- Appalachian States, southern: Watkins, 1124.
- British Columbia: Ries, 935.
- Colorado, eastern: Butler, 180.
- Manitoba: Keele, 619; Ries, 935.
- Nebraska: Barbour, 48.
- Ontario: Keele, 618.
- Quebec: Keele, 617.
- Saskatchewan: Keele, 619; Ries, 935.
- Climate, geologic.** *See* Paleoclimatology.
- Coal.** *See also* Anthracite; Lignite.
- General: Darton, 306.
- Burning of coal beds in place: Bowie, 125.
- Composition and formation: White, 1182.
- Gases in coal: Darton, 308.
- Origin: Jeffrey, 583.
- Reserves of world: Dowling, 364.
- Alaska, Chignik Bay: Crane, 275.
- Kachemak Bay: Parks, 863.
- Alberta, Drumheller field: Macaulay, 720.
- British Columbia: Dowling, 365.
- Canada: Dowling, 366.
- Colorado, North Park: Beekly, 92.
- Idaho: Orofino field: Lupton, 718.
- Illinois: Andros, 22; Cady, 186; Kay, 615.
- Belleville and Breese quadrangles: Udden and Shaw, 1097.
- Danville district: Kay and White, 616.
- Kentucky, Clay and Knox counties: Hodge, 537.
- Drakesboro quadrangle: Crider, 277.
- Dunmore quadrangle: Crider, 278.
- Harlan field: Peck, 868; Sampson, 953.
- Little Muddy quadrangle: Crider, 279.
- Nortonville quadrangle: Crider, 276.
- Perry County: Hodge, 536, 538.
- Michigan: Smith, 1015.
- Montana, Bull Mountain field: Rowe and Wilson, 952.
- Ohio: Burrows, 167.
- Rhode Island: Ashley, 29.
- Rocky Mountain region: Hills, 526-528.
- United States: Aichino, 4; Leshar, 684.
- Utah, Coalville: Wegemann, 1155.
- Emery Co.: Forrester, 420.
- Washington, Pierce County: Daniels, 306.
- West Virginia: Burrows, 155.
- Boone County: Krebs and Teets, 659.
- Logan and Mingo counties: Hennen and Reger, 511.
- Wyoming and McDowell counties: Hennen and Gawthrop, 510.

Coal measures. See Carboniferous

Colorado—Continued.**Economic—Continued.**

- Fluorspar, Mineral County; Lunt, 717.
 Gilpin County: Bastin, 81; Bastin and Hill, 83.
 Gold, Cripple Creek: Patton and Wolf, 867.
 telluride ore, Cripple Creek: Patton, 865.
 Mineral production, 1914: Henderson, 809.
 North Park: Beekly, 92.
 Petroleum, Florence field: Foote, 415.
 Red Cliff region, Colorado: Means, 777.

Physiographic.

- Castle Rock quadrangle: Richardson, 931.
 Yampa River, history: Hancock, 488.

Stratigraphic.

- Castle Rock quadrangle: Richardson, 931.
 Coal Creek batholith, age: Schneider, 961.
 Cretaceous, northeastern Colorado: Heroy, 513.
 Rocky Mountain region: Lee, 673.
 Eastern Colorado: Butler, 180.
 Flow breccias: Patton, 866.
 Fox Hills formation: Stanton, 1032.
 Glacial deposits, Eocene, southwestern Colorado: Atwood, 33.
 North Park: Beekly, 92.
 Red Cliff region, Colorado: Means, 777.
 Yampa River region: Hancock, 488.

Paleontology.

- Allosaurus fragilis: Gilmore, 443.
 Antholites, Florissant: Cockerell, 241.
 Dipterus remains, Devonian: Eastman, 392.
 Equisetum, Florissant: Cockerell, 243.
 Florissant, Insecta: Cockerell, 240.
 Fungus-gnat, Florissant: Cockerell, 246.
 Plagiopodopsis, Florissant: Britton and Hollick, 141.

Petrology.

- Flow breccias: Patton, 866.

Mineralogy.

- Empressite, Kerber Creek district: Bradley, 127.

Columbus folio, Ohio (no. 197): Hubbard *et al.*, 562.

Concretions.

- Formation: Roddy, 941.

Conglomerates.

- Intrusions, Navajo Reservation: Gregory, 472.

Congresses. *See* Associations.

Connate water in oil and gas sands: Johnson, 590;
 Shaw, 986.

Connecticut.**General.**

- Report of geological survey: Conn. G. S., 259.

Physiographic.

- Terraces: Cleland, 237.

Paleontology.

- Triassic, Connecticut Valley: Lull, 712.

Petrology.

- Litchfield sulphide-bearing rocks: Howe, 558,
 559.

Contact phenomena.

- British Columbia, garnet altered from granite:
 Brock, 143.

Copper—Continued.

Alaska: Brooks, 148.

Copper Mountain: Wright, 1209.

Ellamar district: Capps and Johnson, 203.

Kasaan Peninsula: Wright, 1209.

Kotsina-Kuskulana district: Mertie, 799; Moffitt, 811.

Port Valdez district: Johnson, 586.

Prince William Sound: Johnson, 585.

Russian Mountains: Maddren, 748.

Arctic region: Tyrrell, 1089.

Arizona: Helkes, 503.

Bisbee: Dewilde, 347.

Kofa Mountains: Jones, 602.

British Columbia, Roseland: Drysdale, 375.

Similkameen: Keffler, 620.

California: Yale, 1218.

Central States: Butler and Dunlop, 177.

Colorado: Henderson, 509.

Eastern States: Dunlop, 381.

Idaho: Gerry, 439.

Cœur d'Alene: Houston, 571; Ray, 911.

Michigan: Hore, 551; Read, 914.

Montana: Helkes, 506.

Butte: Thompson, 1065.

Nevada: Helkes, 504.

New Mexico: Henderson, 507.

Burro Mountains: Somers, 1021.

Northwest Territories: Tyrrell, 1089.

Oklahoma, southwestern: Fath, 406.

Oregon: Yale, 1218.

Quebec: Bancroft, 42.

Santo Domingo, San Cristobal: Donnelly, 363;
 Garrison, 436.

South Dakota: Henderson, 508.

Texas: Henderson, 507.

red beds: Richard, 928.

United States: Butler, 176.

Utah: Helkes, 505.

Bingham Canyon: Beeson, 93.

Washington: Gerry, 439.

Wyoming: Henderson, 508.

Coppermine country: Tyrrell, 1089.

Copper Mountain, Alaska: Wright, 1209.

Coral reefs and islands.

General: Davis, 326, 327, 331.

Florida: Vaughan, 1112.

Formation: Vaughan, 1112.

Geologic history: Vaughan, 1112.

Glacial-control theory: Daly, 304.

Growth-rate of corals: Vaughan, 1114.

Origin: Curtis, 290; Davis, 330.

United States, southeastern: Vaughan, 1112.

Corals. *See* Anthozoa.

Cordilleras, igneous geology: Lindgren, 689.

Cordilleras, Tertiary orogeny: Ransome, 907.

Correlation. *See* Stratigraphic.

Corundum.

General: Barlow, 68.

Cranbrook area, British Columbia: Schofield, 962.

Cretaceous.

Stratigraphy.

- Alberta: Dowling, 368, 370.
Crownsnest River: McLearn, 743.
oil fields: Dowling, 367.
- Antilles: Vaughan, 1113.
- British Columbia: Dowling, 365.
- California, San Joaquin Valley (west border):
Anderson and Pack, 21.
- Colorado, Castle Rock quadrangle: Richardson,
931.
northeastern: Heroy, 513.
North Park: Beekly, 92.
- Cordilleras: Lindgren, 689.
- Correlation: Stanton *et al.*, 1034.
- Cretaceous-Eocene, Rocky Mountain front and
Great Plain provinces: Ashley, 30.
- Cretaceous-Eocene contact, Atlantic and Gulf
Coastal Plain: Stephenson, 1039.
- Dakota sand, oil, gas, and water contents:
Huntley, 568; Shaw, 987.
- Georgia, Coastal Plain: Stephenson and Veatch,
1041.
- Jurassic-Cretaceous boundary: Osborn, 855.
- Kootenai, age: Berry, 102.
- Mexico, coastal area: Dumble, 380.
eastern: DeGolyer, 342; Dumble, 379.
Furbero field: DeGolyer, 341.
northeastern: Dumble, 378; Garfias, 434.
- Mississippi: Lowe, 709.
- Montana: Sternberg, 1042.
Boulder batholith: Billingsley, 105.
central: Bowen, 119.
Phillipsburg quadrangle: Emmons and Cal-
kins, 190.
Rosebud County: Bowen, 120.
- Morrison formation: Mook, 823.
age: Berry, 102; Lee, 674; Lull, 713; Stanton,
1033.
- New Mexico: Darton, 309.
- New Jersey: Lewis and Kimmel, 687.
- New Mexico, Tularosa Basin: Meinzer and
Hare, 784.
- North Dakota, western: Lloyd and Hares, 696.
- Oklahoma: Shannon and Trout, 983.
- Potomac group, age: Berry, 102.
- Rocky Mountain region: Lee, 673.
- Saskatchewan: McInnes, 734.
- South Dakota, western: Lloyd and Hares, 696.
- Texas: Dumble, 379.
coastal area: Dumble, 380.
Llano Estacado, northern: Baker, 38.
- Utah, Coalville field: Wegemann, 1155.
- Wyoming, Bighorn County: Hintze, 530.
central: Hares, 490.
Niobrara County: Lull, 715.
southern: Heroy, 513.

Paleontology.

- Echinodermata: Clark and Twitchell, 225.
- Flora of southern New York and New England:
Berry, 104.
- Montana, central: Bowen, 119.
Judith River formation, Dryopteris: Knowl-
ton, 656.
- Vertebrata: Bowen, 119.

Cretaceous—Continued.

Paleontology—Continued.

- Wyoming, Niobrara County, Lance fauna: Lull,
715.
- Crinoidea. *See also* Echinodermata.
Porocrinus: Hudson, 563.
- Cross of Hawaii: Jagger, 581.
- Cryptogams. *See* Paleobotany.
- Cryptozoon: Schuchert, 973.
- Crystallographic intergrowths: Segall, 975.
- Cuba. *See also* West Indies.
Economic.
Iron, Daiquiri district: Kemp, 623; Lindgren
and Ross, 695.
Mayari district: Kemp, 622; Leith and Mead,
682.
- Stratigraphic.*
Daiquiri district: Kemp, 623; Lindgren and
Ross, 695.
Mayari district: Kemp, 622.
- Paleontology.*
Megalocnus, Cuba: Torre and Matthew, 1075.
- Petrology.*
Daiquiri: Lindgren and Ross, 695.
Mayari district: Kemp, 622.
- Currents, bottom: Kindle, 645.
- Cynthiana formation: Miller, 804.
- Cystoidea.
Agelacrinites, Canadian: Raymond, 913.
- Cycads. *See* Paleobotany.
- Dakota sand, oil, gas, and water content: Huntley,
568; Shaw, 987.
- Decomposition of rocks. *See* Weathering.
- Definitions. *See* Nomenclature.
- Denudation. *See also* Erosion.
Continental denudation: Shaw, 985.
- Deposition. *See* Sedimentation.
- Deposition of ores. *See* Ore deposits, origin.
- Desmostylus: Hay, 498.
- Desmostylus, Oregon: McCornack, 726.
- Devonian.
General: Clarke, 231.
Paleogeography: Grabau, 463.
- Stratigraphy.*
Alaska, Broad Pass region: Moffit and Pogue,
812.
Gravina Island: Smith, 1012.
- Arizona, Ray quadrangle: Ransome, 909.
- Santa Rita and Patagonia Mountains: Schra-
der, 964.
- British Columbia, Cranbrook area: Schofield,
962.
- Hamilton, western New York: Grabau, 465.
- Kentucky, Jefferson County: Butts, 182.
- Michigan, Houghton County, Limestone Moun-
tain: Case and Robinson, 210.
- Mississippi: Lowe, 647.
- Missouri, central: Branson and Greger, 134.
- Montana, Phillipsburg quadrangle: Calkins and
Emmons, 190.
- Three Forks region: Haynes, 502.

Devonian—Continued.**Stratigraphy—Continued.**

- New Jersey: Lewis and Kümmel, 687.
 New York, Catskill Mountains: Clarke, 233.
 Ohio: Bownocker, 126.
 Columbus quadrangle: Hubbard *et al.*, 562.
 northern: Stauffer, 1036.
 Oklahoma: Wallis, 1130.
 northeastern: Snider, 1019.
 Olentangy shale, central Ohio: Grabau, 464.
 Ontario: Malcolm, 750.
 southwestern: Stauffer, 1035.
 Oriskany-Pic d'Aurore episode: Clarke, 232.
 Quebec, Gaspé: Clarke, 232.
 Saskatchewan: McInnes, 734.
 Utah, Cottonwood-American Fork region: Butler and Loughlin, 178.
 West Virginia, Romney region: Prosser, 903.

Paleontology.

- Colorado, Dipterus remains: Eastman, 392.
 Michigan, Houghton County, Limestone Mountain: Case and Robinson, 210.
 Ontario, southwestern: Stauffer, 1035.

Diatoms.

- Nebraska: Elmore, 397.
 Thomas County: Elmore, 396.

Diffusion of solids: Van Orstrand and Dewey, 1107.

Dikes.

- Inclusions in dikes, origin: Powers, 890.

Dimetrodon incisivus: Case, 207.

Dinosauria. *See* Reptilia.

Dislocations. *See* Faulting.

Distribution. *See* Geographic distribution.

Dolomites.

- Origin: Van Tuyl, 1108-1110.
 Vermont, eastern: Dale,

• **Drainage changes.**

- Indiana: Leverett and Taylor, 686.
 Massachusetts: Kemp, 624.
 Michigan: Leverett and Taylor, 686.
 Minnesota, Minneapolis: Soper, 1022.
 Montana, Missouri River: Bauer, 84.
 New York: Kemp, 624.
 Pennsylvania: Kemp, 624.

Drift deposits. *See also* Glacial geology.

- Nebraska: Barbour, 50.
 Ontario, Rainy River district: Johnston, 599.
 Quebec, Montreal: Stansfield, 1031.

Dunes.

- California, Monterey: Campbell, 192.
 Sand dunes: Townsend, 1076.

Dynamic and structural (general). *For regional, see the various States. See also list of subject headings on p. 87.*

- Arid erosion, measure of: Keyes, 641.
 Burning of coal beds in place: Bowie, 125.
 Currents, bottom: Kindle, 645.
 Heave-fault slipping, cause: Wood, 1206.
 Intraformational contorted strata, Trenton Falls: Miller, 808.
 Gravels, formation and distribution: Gregory, 471.
 Gypsum and salt deposits, origin: Branson, 133.
 Lake Erie region, recent crustal movements: Decker, 339.

Dynamic and structural—Continued.

Pressure effects on rocks and minerals: Johnston, 565.

Prismatic structure: Sosman, 1023, 1024.

Shape of pebbles: Gregory, 470.

Strain, production of: Wood, 1206.

Stratigraphic disturbance through the Ohio Valley: Gardner, 430.

Earth as a heat engine: Becker, 89.

Earth, genesis of. *See also* Dynamic and structural (general).

Planetesimal hypothesis: Chamberlin, 214.

Earth, interior.

General: Chamberlin, 213; Hayford, 501; Lane, 606; Reid, 918; Schlesinger, 960.

Earth movements. *See* Landslides.

Earth's crust, strength: Barrell, 70.

Earthquakes. *See also* Seismology.

California, central, November 8, 1914: Davis, 319.

Imperial Valley, June 22, 1915: Beal, 87.

Los Alamos, 1915: Beal, 86.

October 7, 1915: Davis, 320.

registration: Davis, 318.

Costa Rica, Cartago, 1910: Fernández Guardia, 411.

Hawaii, seismic prelude, Mauna Loa eruption, 1914: Wood, 1205.

Heave-fault slipping, cause: Wood, 1206.

Mexico, Mexico, Acambay-Tixmadeje: Urbina and Camacho, 1101.

Nevada, Pleasant Valley, October 2, 1915: Jones, 605.

Pacific coast region: Branner, 131.

Panama: MacDonald, 728.

Seasonal periodicity: Spalding, 1025.

South Carolina, 1914: Taber, 1055.

Vibrations, direction: Branner, 130.

1911, February 18: Klotz, 650.

Echinodermata. *See also* Asteroidea; Blastoidea; Crinoidea; Cystoidea; Echinoidea.

Hydrospires: Hudson, 563.

Inorganic constituents: Clarke and Wheeler, 227.

Mesozoic and Cenozoic: Clark and Twitchel, 225.

Echinoidea.

California, San Pablo group: Kew, 629.

Economic (general). *For regional see under the various States. See also* Ore deposits, origin, and the particular products.

Alunite and pyrophyllite, association: Turner, 1083.

Chalcoite in ore deposits: Graton, 468.

Colloidal gold and silver: Bastin, 80.

Connate water in oil and gas sands: Shaw, 966.

Dakota sand, oil, gas, and water contents: Huntley, 568; Shaw, 987.

Igneous intrusions: Rickard, 933.

Literature, 1915: Knopf, 654.

Metallogenetic epochs, pre-Cambrian, Ontario: Miller and Knight, 806.

Ore deposits in sandstone: Kennan, 625.

Quartz veins in lamprophyre intrusions: McLennan, 747.

Replacement, Butte, Montana: Ray, 912.

Educational. *See also* Textbooks.

Mnemonic couplet: Todd, 1000.

Elevation and subsidence. *See* Changes of level.

Ellamar district, Alaska: Capps and Johnson, 203.

Ellipsoidal lavas, Prince William Sound, Alaska: Capps, 199.

Eocene. *See* Tertiary.

Eoceratops: Lambe, 664.

Eolian action. *See* Wind work.

Epigene profiles of the desert: Lawson, 671.

Erosion. *See also* Sedimentation; Glacial erosion.

General: Davis, 322.

California, Sierra Nevada: Muir, 831.

Continental denudation: Shaw, 985.

Desert regions: Lawson, 671.

Earth's rotation and stream erosion: Eakin, 390.

Gravels, formation and distribution: Gregory, 471.

Limestone solution on bottom of Lake Ontario: Kindle, 646.

New Jersey, coast: Johnson and Smith, 589.

Eruptive rocks. *See* Igneous and volcanic rocks.

Essays. *See* Addresses.

Eurypterida.

General: Barbour, 52.

Virginia, Lyons Gap: Shuler, 998.

Evolution.

General: Matthew, 768.

Origin of single characters: Osborn, 853.

Tetrapoda, origin: Gregory, 474.

Excursions.

New England intercollegiate, thirteenth: Cleland, 237.

Transcontinental excursion, 1912: *Am. Geog. Soc.*, 15.

Experimental investigations.

Ice: Tarr and Von Engel, 1058.

Faulting.

Alaska, Nizina River: Capps, 202.

Canada, St. Lawrence Valley: Kindle and Burling, 647.

Great Basin: Louderback, 700.

Heave-fault slipping, cause: Wood, 1206.

Montana, Philipsburg quadrangle: Calkins and Emmons, 190.

New Mexico, coal fields: Kirk, 648.

Panama Canal Zone: MacDonald, 729.

Pennsylvania, South Mountain: Stoes, 1053.

South Dakota, Homestake ore body: Paige, 784.

Feldspar.

Georgia: Galpin, 429.

United States: Katz, 612.

Feldspars, perthitic, quantitative study: Warren, 1135.

Floids, nature and origin: Johnson, 588.

Fishes. *See* Pisces.

Fissures. *See* Faulting.

Florida.*General.*

General: Sellards, 977.

Economic.

Central Florida: Sellards, 979.

Florida—Continued.*Economic—Continued.*

Mineral industries: Sellards, 977.

Phosphate: Matson, 764; Sellards, 978.

Soils, Bradford County: Sellards, 977.

Pinellas County: Sellards, 977.

Physiographic.

Coral reefs: Vaughan, 1112.

Stratigraphic.

General: Dall, 301.

Central Florida: Sellards, 979.

Ocala area: Sellards, 979.

Ocala limestone, age: Cooke, 268.

Phosphate districts: Matson, 764.

Southern Florida: Sellards, 978.

Paleontology.

Chlamytherium septentrionalis: Sellards, 981.

Mammalia, phosphate beds: Sellards, 978.

Mollusca, Oligocene, Tampa: Dall, 301.

Ocala limestone fauna: Cooke, 268.

Tomistoma, Polk County: Sellards, 980.

Flow breccias: Patton, 866.

Fluorspar.

Colorado, Mineral County: Lunt, 717.

United States: Burchard, 161.

Folding.

Montana, Philipsburg quadrangle: Calkins and Emmons, 190.

New York, St. Lawrence Valley: Chadwick, 211.

Foot prints.

Connecticut Valley: Lull, 712.

Foraminifera.

Cuba, Orbitoides: Kemp, 622.

Fossils. *See* Paleontology.

Franklin mining camp, British Columbia: Drysdale, 374.

Frigites: Barbour, 50.

Fuel oil in Southwest: Phillips, 880.

Gallinuloides wyomingensis: Shufeldt, 996.

Garnet group, relations of properties: Ford, 418.

Gas. *See* Natural gas.

Gastropoda. *See also* Mollusca.

Arizona, Mesozoic, fresh-water: Robinson, 940.

Fulgur: Smith, 1006.

Rissolina, Pacific states: Bartsch, 75.

Tejon fauna: Dickerson, 348.

Tertiary, West: Cockerell, 244.

Gems. *See* Precious stones.

Genesis of ores. *See* Ore deposits, origin.

Geochemistry.

Bornite as silver precipitant: Palmer, 860.

Calcite, solubility in water: Wells, 1169.

Colloidal gold and silver: Bastin, 80.

Fractional precipitation of ore-forming compounds: Wells, 1166.

Inorganic constituents of Alcyonaria: Clarke and Wheeler, 229.

Magnesium carbonate, solubility in natural waters: Wells, 1169.

Potash brines, evaporation: Hicks, 519.

Silver, precipitation by covellite: Elley, 393.

Geogenesis. *See* Earth, genesis of.

Geographic distribution.

General: Matthew, 768.

Criocetus, Permo-Carboniferous: Case, 209.

Mammalia: Matthew, 767.

Geologic climate. *See* Paleoclimatology.

Geologic formations described. *See list, p. 126.*

Tables. *See* Stratigraphic, Tables of formations.

Geologic history. *See also* Paleoclimatology and Paleogeography.

Alaska, Broad Pass region: Moffit and Pogue, 812.

Ellamar district: Capps and Johnson, 203.

Kenai Peninsula: Martin *et al.*, 757.

Arizona, Santa Rita and Patagonia Mountains: Schrader, 964.

Bay of Fundy: Powers, 896.

British Columbia, Beaverdell area: Reinecke, 920.

coast region: Clapp, 218.

Cranbrook area: Schofield, 962.

Franklin mining camp, West Kootenay: Drysdale, 374.

Golden-Kamloops: Daly, 302.

Roseland: Drysdale, 375.

Selkirk Mountains: Burwash, 169.

southwestern: Tyrrell, 1092.

Cambrian: Walcott, 1124.

Colorado, Castle Rock quadrangle: Richardson, 931.

southwestern: Atwood, 33.

Coral reefs: Vaughan, 1112.

Cordilleras: Lindgren, 689; Ransome, 907.

Dakota sand: Huntley, 568.

Florida, southern: Sellards, 978.

Hawaii: Jagger, 581.

Illinois, Belleville and Breesee quadrangles: Udden and Shaw, 1097.

Indiana, Flatwoods region, Owen and Monroe counties: Malott, 751.

Kentucky, Jefferson County: Butts, 182.

western: Crider, 276.

Mexico, coastal area: Dumble, 380.

eastern: Dumble, 379.

Mississippi: Lowe, 709.

Mississippi embayment: Berry, 98.

Missouri: Hinds and Greene, 529.

Missouri River, Tertiary history: Bauer, 84.

Montana, Boulder batholith: Billingsley, 105.

Glacier National Park: Campbell, 191.

Philipsburg quadrangle: Calkins and Emmons, 190.

Morrison formation: Mook, 823.

Nevada, southeastern: Carpenter, 204.

New Jersey: Lewis and Kummel, 687.

New Mexico, Tularosa Basin: Meinzer and Hare, 784.

Nova Scotia, Shelburne County: Powers, 891.

Ohio, Columbus quadrangle: Hubbard *et al.*, 562.

Oklahoma: Wallis, 1130.

Carter County: Wegemann and Heald, 1161.

Ozark uplift: Siebenthal, 999.

Pacific coast region: Tolman, 1070.

Porto Rico: Berkey, 96.

Pre-Cambrian: Coleman, 252.

Quebec, Beauce County: Tyrrell, 1088.

Geologic history—Continued.

Rocky Mountain region: Ashley, 30; Lee, 674.

Cretaceous-Tertiary time: Ashley, 31.

Texas: Dumble, 379.

coastal area: Dumble, 380.

Llano Estacado, northern: Baker, 38.

Utah, Tintic district: Crane, 273.

Washington, Kittitas County: Saunders, 954.

Skykomish basin: Smith, 1018.

Wyoming, Bighorn County: Hintze, 530.

western: Blackwelder, 108.

Geologic maps.

Alaska, Broad Pass region: Moffit and Pogue, 812.

Copper Mountain area: Wright, 1209.

Ellamar district: Capps and Johnson, 203.

Gravina Island: Smith, 1012.

Kasaan Peninsula: Wright, 1209.

Kenai Peninsula: Martin *et al.*, 757.

Ketchikan district: Wright, 1209.

Kotsina-Kuskulana district: Moffit, 811.

Kuskokwim region: Smith, 1013.

Nelchina-Susitna region: Chaplin, 215.

Prince William Sound, mineral resources: Johnson, 586.

Willow Creek district: Capps, 197.

Alberta, Banff district: Adams and Dick, 3.

Arctic, Ellesmere Land region: Schel, 969.

Arizona, Kofa Mountains: Jones, 602.

Santa Rita and Patagonia Mountains: Schrader, 964.

British Columbia, Beaverdell area: Reinecke, 920.

coal fields: Dowling, 366.

Cranbrook area: Schofield, 962.

Franklin mining camp, West Kootenay: Drysdale, 374.

Golden-Kamloops: Daly, 302.

Shuswap Lake, Kamloops district: Daly, 302.

California, Iron Mountain region, Shasta County: Hershey, 514.

Los Angeles and Orange cos.: McLaughlin and Waring, 741.

Monterey and San Luis Obispo cos.: McLaughlin and Waring, 741.

Mount Shasta: Diller, 353.

San Joaquin Valley: Dickerson, 348.

San Joaquin Valley (west border): Anderson and Pack, 21.

San Luis Obispo and Kern cos.: McLaughlin and Waring, 741.

San Pablo group: Clark, 220.

Tesla quadrangle: Anderson and Pack, 21.

Ventura and Los Angeles cos.: McLaughlin and Waring, 741.

Weaverville quadrangle: Ferguson, 409.

Colorado, Castle Rock quadrangle: Richardson, 931.

Montrose quadrangle, glacial: Atwood, 33.

North Park: Beekly, 92.

Yampa River region: Hancock, 488.

Connecticut Valley Triassic area: Lull, 712.

Florida, peninsular portion: Matson, 764.

Georgia, Coastal Plain: Stephenson and Veatch, 1041.

northern: Galpin, 429.

Geologic maps—Continued.

- Illinois, Belleville and Breese quadrangles: Udden and Shaw, 1097.
- Indiana, Bloomington quadrangle: Beede *et al.*, 91.
- glacial: Leverett and Taylor, 686.
- Kentucky, Drakesboro quadrangle: Crider, 377.
- Dunmore quadrangle: Crider, 378.
- Jefferson County: Butts, 182.
- Little Muddy quadrangle: Crider, 379.
- Nortonville quadrangle: Crider, 376.
- Michigan: Leith and Allen, 680; Leverett and Taylor, 686.
- Gogebic iron range: Allen and Barrett, 12.
- Upper Peninsula (part): Allen and Barrett, 12.
- Minnesota, surface formations: Leverett, 685.
- Mississippi: Lowe, 709.
- Missouri: Hinds and Greene, 529.
- Pennsylvanian series: Hinds and Greene, 529.
- Montana, Boulder batholith: Billingsley, 106.
- Bull Mountain coal field: Rowe and Wilson, 952.
- central: Bowen, 119.
- Phillipsburg quadrangle: Calkins and Emmons, 190.
- Rosebud County, Porcupine dome: Bowen, 120.
- Nevada, Aurora district: Hill, 520.
- Battle Mountains: Hill, 520.
- Clark County, Yellowpine district: Knopf, 651.
- Douglas County: Hill, 520.
- Mineral district: Hill, 520.
- National district: Lindgren, 690.
- Peavine district: Hill, 520.
- Toiyabe Range: Hill, 520.
- Newfoundland, southeastern: Dale, 206.
- New Jersey: Lewis and Kimmel, 687.
- New Mexico, Burro Mountains: Somers, 1021.
- mining map: Jones, 603.
- New York, Canton quadrangle: Chadwick, 211.
- North America: Pirsson and Schuchert, 884.
- North Dakota, western: Lloyd and Hares, 696.
- Ohio, Waverly: Hyde, 573.
- Columbus quadrangle: Hubbard *et al.*, 562.
- Oklahoma: Wegemann, 1156.
- Arbuckle Mountains: Wallis, 1130.
- Cotton and Jefferson counties: Wegemann, 1156.
- northeastern: Snider, 1019.
- Wichita Mountains: Taylor, 1061.
- Ontario: Miller and Knight, 806, 807.
- central: Barlow, 68.
- southwestern: Stauffer, 1035.
- Ozark uplift: Siebenthal, 999.
- Panama Canal Zone: MacDonald, 729.
- Pennsylvania, southwestern: Pa. T. G. S., 870.
- Permo-Carboniferous: Case, 206.
- Quebec, copper-bearing rocks: Bancroft, 42.
- Rhode Island coal field: Ashley, 29.
- South Dakota, western: Lloyd and Hares, 696.
- Texas, eastern: Dumble, 377.
- United States, western: Campbell *et al.*, 193; Darton *et al.*, 311; Diller *et al.*, 358; Lee *et al.*, 675.
- Utah, Coalville field: Wegemann, 1155.
- Cottonwood-American Fork region: Butler and Loughlin, 178

Geologic maps—Continued.

- Washington, Kittitas County: Saunders, 954.
- Skykomish basin: Smith, 1018.
- West Virginia, Boone Co.: Krebs and Teets, 659.
- Logan Co.: Hennen and Reger, 511.
- Mingo Co.: Hennen and Reger, 511.
- Wyoming and McDowell counties: Hennen and Gawthrop, 510.
- Wisconsin: Leith and Allen, 680.
- Yukon, upper White River district: Cairnes, 187.
- Geologic time.**
- Glaciation in Alaska: Capps, 201.
- Pleistocene climatic oscillations: Reeds, 916.
- Geological surveys.** *See* Surveys.
- Geomorphogeny.** *See* Physiographic.
- Geomorphology.** *See* Physiographic.
- Geophysics.**
- Earth as a heat engine: Becker, 89.
- Earth's crust, strength: Barrell, 70.
- Pressure in formation of rocks and minerals: Johnston, 594.
- Georgia.**
- Economic.**
- Barite: Watson and Grasty, 1148.
- Bauxite, central Georgia: Watkins, 1143.
- Feldspar: Galpin, 429.
- Mica: Galpin, 429.
- Physiographic.**
- Coastal Plain: Stephenson and Veatch, 1041.
- Stratigraphic.**
- Coastal Plain: Stephenson and Veatch, 1041.
- Petrology.**
- Pegmatite: Galpin, 429.
- Underground water.**
- Coastal Plain: Stephenson and Veatch, 1041.
- Glacial erosion.**
- General: Meunier, 800.
- Illinois: Rich, 926.
- Glacial geology.** *See also* Quaternary.
- General: Hobbs, 532; Meunier, 800; Osborn, 854.
- Glacial succession: Leverett and Taylor, 686.
- Interglacial period, earliest: Coleman, 255.
- Pleistocene climatic oscillations: Reeds, 916.
- Alaska: Capps, 201.
- Broad Pass region: Moffitt and Pogue, 812.
- glacial stages: Capps, 200.
- Kenai Peninsula: Martin *et al.*, 757.
- Willow Creek district: Capps, 197.
- British Columbia, Golden-Kamloops: Daly, 302.
- Driftless area: Trowbridge, 1078.
- Great Lakes region: Leverett and Taylor, 686.
- Indiana: Leverett and Taylor, 686.
- Flatwoods region, Owen and Monroe counties: Malott, 751.
- Tippecanoe County, Shawnee Mound: McBeth, 721.
- Leaching of Pleistocene drifts, Iowa: Leighton, 677.
- Kansas, eastern: Wooster, 1208.
- Maine, Mount Katahdin: Curtis, 291.
- Massachusetts, Boston basin, pre-Wisconsin drift: Wentworth, 1170.
- Michigan: Leverett and Taylor, 686.
- Minnesota, Minneapolis, Soper, 1022.
- northwestern: Leverett, 685.

Glacial geology—Continued.

- Missouri, silver in glacial material: Tarr, 1060.
 New Hampshire, Lost River: Goldthwait, 459.
 New York, Catskill Mountains: Rich, 925.
 Ithaca region, interglacial gorges: Rich and Filmer, 927.
 Nova Scotia, Shelburne County: Powers, 891.
 Ohio, Columbus quadrangle: Hubbard *et al.*, 562.
 Dayton: Foerste, 413.
 Ontario, Rainy River district: Johnston, 599.
 Quebec, Magdalen Islands: Goldthwait, 457.
 Montreal: Stansfield, 1031.
 Washington, western: Bretz, 135.
 Wyoming, western: Blackwelder, 108.

Glacial lakes. *See also* Beaches; Shore lines; Terraces.

- Lake Agassiz: Upham, 1100.
 Great Lakes region: Leverett and Taylor, 686.
 Indiana: Leverett and Taylor, 686.
 Michigan: Leverett and Taylor, 686.
 Minnesota: Leverett, 685.

Glacial period. *See* Glacial geology.**Glacial stris.**

- Canada, maritime provinces: Goldthwait, 457.

Glaciation, Eocene: Atwood, 33.**Glaciers.****General.**

- Anticyclones above continental glaciers: Hobbs, 534.
 Experimental studies on ice structure: Von Engeln, 1120.
 Motion, experimental studies: Tarr and Von Engeln, 1058.
 Origin: Meunier, 800.
 Variations: Reid, 919.
 Alaska: Martin, 738.
 Broad Pass region: Moffit and Pogue, 812.
 southeastern: Martin, 761.
 British Columbia, glaciers, motion: Vaux, 1117, 1118.
 Robson Glacier: Wheeler, 1174.
 Yoho Glacier, motion: Wheeler, 1171-1173.
 Greenland: Koch, 657.
 Montana, Glacier National Park: Campbell, 191.
 Rocky Mountains: Coleman, 253.

Glacier National Park: Campbell, 191.**Gneiss, origin:** Meunier, 801.**Gold.****General.**

- Colloidal gold: Bastin, 80.
 Alaska: Brooks, 147, 148.
 Chisana field: Cairnes, 189.
 Chisana-White River district: Capps, 198.
 Fairbanks district: Eakin, 385.
 Hot Springs district: Eakin, 386.
 Juneau region: Eakin, 384.
 Juneau district: Hyder, 574.
 Kotsina-Kuskulana district: Moffit, 811.
 Kuskokwim region: Maddren, 748.
 Lake Clark-Iditarod region: Smith, 1013.
 Melchiana-Susitna region: Chapin, 215.
 Port Valdez district: Johnson, 586.
 Prince William Sound: Johnson, 585.
 Seward Peninsula: Eakin, 388.
 Shushana district: Ellis, 394.

Gold—Continued.**Alaska—Continued.**

- Willow Creek district: Capps, 197.
 Yakataga beach placers: Thompson, 1066.
 Alberta, North Saskatchewan River: Tyrrell, 1090.
 Arizona: Helkes, 503.
 Arizona, Kofa Mountains: Jones, 602.
 placers: McClure, 724.
 Quartzsite: Jones, 601.
 California: Yale, 1218.
 Klamath Mountains: Ferguson, 409.
 Seneca district: Wright, 1216.
 Canada: Tyrrell, 1087.
 Colorado: Henderson, 509.
 Cripple Creek, Cresson strike: Patton and Wolf, 867.

Eastern States: Dunlop, 381.**Idaho:** Gerry, 439.**Snake River:** Hill, 521.**Montana:** Helkes, 506.**Nevada:** Helkes, 504.**National district:** Lindgren, 690.**New Mexico:** Henderson, 507.**Pinos Altos district:** Bush, 170; Wright, 1215.**North Carolina, Montgomery County, Coggins mine:** Pratt, 897.**Montana, North Moccasin Mountains:** Freeman, 422.**Ontario, Kowkash area:** Hopkins, 550.**Porcupine district:** Tyrrell, 1091; Whitman, 1185.**pre-Cambrian:** Tyrrell, 1087.**Oregon:** Yale, 1218.**Quebec, Beauce County:** Tyrrell, 1088.**Saskatchewan, Amisk Lake district:** Bruce, 154.**South Dakota:** Henderson, 508.**Southern Appalachians:** Dodge, 359.**Texas:** Henderson, 507.**Utah:** Helkes, 505.**Washington:** Gerry, 439.**Wyoming:** Henderson, 508.**Yukon, southwestern:** Cairnes, 188.**White River district:** Cairnes, 187.**Goniometer, crystal-grinding:** Wright, 1212.**Granite.****Disaggregation:** Tarr, 1059.**Heating tests:** Tarr, 1059.**Oklahoma:** Taylor, 1061.**Graphite.****General:** Miller, 805.**Pennsylvania:** Miller, 805.**United States:** Bastin, 82.**Graptolites.****Protistograptus, St. John, New Brunswick:** McLearn, 745.**Virginia, Athens shale:** Powell, 889.**Gravel.****Formation and distribution:** Gregory, 471.**United States:** Loughlin, 705.**Washington, Puget Sound:** Borhek, 118.**Gravine Island, Alaska:** Smith, 1012.**Great Lakes.****History:** Leverett and Taylor, 686.

Greenland.*Dynamic and structural.*

Ice phenomena: Koch, 657.

Minerology.

Dahllite, Kangerdluarsuk: Bøggild, 114.

Leifite, Narsarsuk: Bøggild, 115.

Greybull oil and gas field, Wyoming: Hintze, 530.

Ground-ice wedges, Alaska: Leffingwell, 678.

Guidebook, western United States: Campbell *et al.*, 193; Darton *et al.*, 311; Diller *et al.*, 358; Lee *et al.*, 675.

Gypsum.*General.*

Origin: Branson, 132, 133.

Iowa, Fort Dodge: Keyes, 635.

Manitoba: Wallace, 1129.

United States: Loughlin, 704.

Wyoming: Branson, 132.

Gypsum and salt deposits, origin: Branson, 133.

Hawaiian Islands.*General.*

Leeward Islands: Elschner, 396.

Dynamic and structural.

Volcanoes: Jaggar, 581; Moore, 826; Powers, 893.

Kilauea: Day, 336; Jaggar, 583; Powers, 892.

drop-fault crater: Curtis, 288.

Manna Loa: Powers, 892.

activity 1914-15: Jaggar, 579.

eruption: Friedlaender, 424; Jaggar, 578.

1914, seismic prelude: Wood, 1205.

Physiographic.

Kilauea, drop-fault crater: Curtis, 288.

Volcanoes: Jaggar, 581.

Stratigraphic.

Tertiary, Oahu: Hitchcock, 531.

Petrology.

Lavas: Cross, 281.

Healdton oil field, Carter County, Oklahoma: Wegemann and Heald, 1161.

Hemicones: Decker, 340.

Herbaceous plants, evolution: Sinnott and Bailey, 1002.

Hesperornis regalis: Shufeldt, 997.

History, philosophy, etc.

Iowa: Keyes, 632.

Nebraska, geological survey: Barbour, 46.

Surveying, early: Stevenson, 1049.

Hot Springs. *See* Thermal waters.

Huronian. *See* Pre-Cambrian.

Hydrosoc.

Medusina, Carboniferous, Nebraska: Barbour, 53.

Ice age. *See* Glacial geology.

Ice ages, ancient.

Devonian: Clarke, 236.

Pre-Cambrian: Coleman, 252.

Tertiary, Eocene, Colorado: Atwood, 33.

Ice structure, experimental studies: Von Engel, 1120.

Idaho.*Economic.*

Coal, Orofino field: Lupton, 718.

Copper, Coeur d'Alene: Huston, 571; Ray, 911.

Gold, Snake River: Hill, 521.

Idaho—Continued.*Economic—Continued.*

Mineral production, 1914: Gerry, 439.

Nitrate deposits, southern Idaho: Mansfield, 752.

Stratigraphic.

Fort Hall Indian Reservation: Mansfield, 753.

Orofino coal field: Lupton, 718.

Petrology.

Nepheline basalt, Fort Hall Indian Reservation: Mansfield and Larsen, 699.

Igneous and volcanic rocks. *See also* Intrusions; Magmas.*General.*

Calcium orthosilicate in norm of igneous rocks: Washington, 1140.

Columnar structure: Sosman, 1023.

Correlation of potassium and magnesium, sodium and iron in igneous rocks: Washington, 1141.

Crystallization: Bowen, 123, 124.

Evolution: Bowen, 123.

Flow breccias: Patton, 866.

Metamorphism: Leith and Mead, 681.

Alaska, Broad Pass region: Moffit and Pogue, 812.

Gravina Island: Smith, 1012.

Kenai Peninsula: Martin *et al.*, 757.

Ketchikan district: Wright, 1209.

Willow Creek district: Capps, 197.

Arizona, Kofa Mountains: Jones, 602.

Santa Rita and Patagonia Mountains: Schrader, 964.

British Columbia, Beaverdell area: Reinecke, 920.

Cranbrook area: Schofield, 962.

Franklin mining camp, West Kootenay: Drysdale, 374.

Golden-Kamloops: Daly, 302.

Kyuquot Sound: Clapp, 217.

Rossland: Drysdale, 375.

California, Sierra Nevada: Turner, 1064.

Colorado, Castle Rock quadrangle: Richardson, 931.

North Park: Beekly, 92.

Red Cliff region: Means, 777.

Connecticut, Litchfield: Howe, 558.

Cordilleras: Lindgren, 699.

Cuba, Daiquiri district: Kemp, 623.

Georgia, northern: Galpin, 429.

Hawaii, lavas: Cross, 281.

Mexico, Mexico, Acambay-Tixmadeje: Urbina and Camacho, 1101.

Michigan, Upper Peninsula: Allen and Barrett, 12.

Montana, Phillipsburg quadrangle: Calkins and Emmons, 190.

Nevada, National district: Lindgren, 690.

Tonopah: Spurr, 1029.

New Mexico, Burro Mountains: Somers, 1021.

New York, Adirondack region: Cushing, 293.

Nova Scotia, Halifax, granite contact zone: McIntosh, 735.

Nova Scotia, Shelburne County: Powers, 891.

Oklahoma, granite: Taylor, 1061.

northeastern: Snider, 1019.

Igneous and volcanic rocks—Continued.

- Ontario, Haliburton County, nephelite syenite: Foye, 421. —
 Panama Canal Zone: MacDonald, 729.
 Pennsylvania, Piedmont region: Bascom, 76.
 Porto Rico: Berkey, 96.
 Rhode Island: Hawkins and Brown, 495.
 Utah, Cottonwood-American Fork region: Butler and Loughlin, 178.
 Tintic district: Crane, 273.
 Virginia, Blue Ridge: Watson and Cline, 1147.
 Cambrian extrusive basalt: Watson and Cline, 1146.
 Washington, Skykomish basin: Smith, 1018.
 Yukon, upper White River district: Cairnes, 187.

Igneous intrusion. See Intrusions.**Illinois.***Economic.*

- Belleville and Breese quadrangles: Udden and Shaw, 1097.
 Coal: Andros, 22.
 Belleville and Breese quadrangles: Udden and Shaw, 1097.
 District I: Cady, 186.
 District VII: Kay, 615.
 District VIII (Danville): Kay and White, 616.
 Natural gas, Gillespie and Mt. Olive quadrangles: Lee, 672.
 Greenville field: Blatchley, 112.
 Petroleum, Allendale field: Rich, 924.
 Colmar field: Morse and Kay, 829.
 Gillespie and Mt. Olive quadrangles: Lee, 672.
 Litchfield field: Blatchley, 112.
 Soils, Lake County: Hopkins *et al.*, 548.
Dynamic and structural.
 Chestnut Ridge disturbance: Gardner, 430.
 Deformation, Quaternary, southern Illinois: Shaw, 988.
 Glacial erosion: Rich, 926.
 Monks Mound, origin: Crook, 280.
 Randolph County, anticline: Weller, 1164.

Physiographic.

- Belleville and Breese quadrangles: Udden and Shaw, 1097.
 Deformation, Quaternary, southern Illinois: Shaw, 988.
 Monks Mound, origin: Crook, 280.

Stratigraphic.

- Alexandrian, northeastern Illinois: Savage, 955.
 Allendale oil field, Wabash County: Rich, 924.
 Belleville and Breese quadrangles: Udden and Shaw, 1097.
 Bond, Macoupin, and Montgomery counties: Blatchley, 112.
 Borings: Cady, 186; Kay, 615; Udden, 1093.
 Colmar oil field: Morse and Kay, 829.
 area south of: Morse and Kay, 828.
 Danville district: Kay and White, 616.
 Gillespie and Mt. Olive quadrangles: Lee, 672.

Paleontology.

- Pleistocene mollusks: Baker, 39.

Underground water.

- Chicago area: Anderson and DeWolf, 19.

Indiana.*General.*

- Report, Department of Geology: Barrett, 72.
Economic.
 Bloomington quadrangle: Beede *et al.*, 91.
 Limestone, Bloomington quadrangle: Beede *et al.*, 91.
 Petroleum: Barrett, 73.
 Soils, Clinton County: Tharp *et al.*, 1064.
 Elkhart County: Jones and Hosler, 604.
 Howard County: Coryell and Rose, 271.
 Jay County: Hole, 539.
 Warren County: Grimes and Stevens, 480.

Physiographic.

- Flatwoods region, Owen and Monroe counties: Malott, 751.
 Shawnee Mound, Tippecanoe County: McBeth, 721.

Stratigraphic.

- Bloomington quadrangle: Beede *et al.*, 91.
 Flatwoods region, Owen and Monroe counties: Malott, 751.
 Loess, southwestern Indiana, origin: Shaw, 984.
 Pleistocene: Leverett and Taylor, 686.
 Richmond beds, Spades: Coryell, 270.

Paleontology.

- Bloomington quadrangle, paleobotany: Jackson, 577.

- Richmond beds, Spades: Coryell, 270.

Underground water.

- General: Beede, 90; Cumings, 284.

- Inclusions in dikes, origin: Powers, 890.

Infusorial earth.

- General: Dolbear, 360.

Insecta.

- General: Cockerell, 242.
 Colorado, Florissant: Cockerell, 240.
 Fungus-gnat: Cockerell, 246.

- Interglacial gorges of Six Mile Creek, Ithaca, New York: Rich and Filmer, 927.

- Interglacial period, earliest: Coleman, 255.

- Intrusions.** *See also* Dikes; Igneous and volcanic rocks; Laccoliths; Magmas.

- Conglomeratic, Navajo Reservation: Gregory, 472.

- Cordilleras: Lindgren, 689.

- Igneous intrusions: Rickard, 933.

- Inclusions in dikes, origin: Powers, 890.

- Invertebrata (general).** *See also* Anthozoa, Brachiopoda, Bryozoa, Crustacea, Echino-dermata, Foraminifera, Insecta, Mollusca, Problematica, Spongia, and Vermes.

- Arkansas, Batesville fauna: Girty, 449.

- Boone chert fauna: Girty, 450.

- Boone limestone fauna: Girty, 451.

- Carboniferous, Morrow group: Mather, 763.

- Chester group, Oklahoma: Snider, 1020.

- Missouri, Pennsylvanian: Girty, 452.

- Nebraska: Barbour, 60.

- Oklahoma, Chester group: Snider, 1020.

- Ontario, Eramosa beds: Williams, 1191.

- San Pablo fauna, California: Clark, 220.

- Triassic, Connecticut Valley: Lull, 712.

- West Virginia, Boone County: Price, 902.

- Wewoka fauna, Oklahoma: Girty, 448.

Iowa.*Economic.*

Gypsum, Fort Dodge, Miocene age: Keyes, 635.

Dynamic and structural.

Leaching of Pleistocene drifts: Leighton, 677.

Physiographic.

Terrace, post-Wisconsin, Des Moines region: Tilton, 1068.

Stratigraphic.

Pella limestone: Waller and Van Tuyl, 1165.

Table of formations: Keyes, 632.

Wisconsin drift southwest of Des Moines: Tilton, 1067.

Iron.

General: Oeljer, 437.

Bacteria, iron: Harder, 499.

Bog ore deposits, formation and distribution: Dake, 297.

Residual ores, formation and distribution: Dake, 296.

Titaniferous ores: Singewald, 1001.

Alaska, Nome: Eakin, 387.

Cuba, Daiquiri district: Kemp, 623; Lindgren and Ross, 695.

Mayari district: Kemp, 622; Leith and Mead, 682.

Lake Superior region: Crowell & Murray, 283.

Louisiana, northwestern: Burchard, 159.

Michigan, Crystal Falls: Ives, 576.

Minnesota: Van Barneveld, 1102.

Cuyuna district: Appleby and Newton, 26; Cheney, 216; McCarty, 722.

Mesabi Range: Appleby and Newton, 24; Wolff, 1204.

Newfoundland: McDonald, 730.

Wabana region: Hayes, 499.

North Carolina, Ashe County, magnetic ores: Pratt, 808.

Tennessee, Lewis County: Rogers, 946.

Texas, northeastern: Burchard, 158.

United States: Burchard, 160.

Virginia, Oriskany ores: Weld, 1163.

Isostasy.

General: Becker, 88.

Earth's crust, strength: Barrell, 70.

Judith River formation, Montana: Bowen, 119.

Jurassic.*Stratigraphy.*

Alaska, Kenai Peninsula: Martin *et al.*, 757.

British Columbia, Franklin mining camp, West Kootenay: Drysdale, 374.

Golden-Kamloops: Daly, 302.

Colorado, Castle Rock quadrangle: Richardson, 931.

North Park: Beekly, 92.

Cordilleras: Lindgren, 699.

Cretaceous-Jurassic Boundary: Osborn, 855.

Montana, Phillipsburg quadrangle: Calkins and Emmons, 190.

Morrison formation: Mook, 823.

age: Berry, 102; Lee, 674; Lull, 713; Stanton, 1033.

New Mexico: Darton, 309.

Wyoming, Bighorn County: Hintze, 530.

Paleontology.

Echinodermata: Clark and Twitchell, 225.

Kansas.*Economic.*

Kaw Valley anticline: Warfel, 1132.

Natural gas: Gould, 462.

Petroleum: Gould, 462.

Zinc and lead, Joplin district: Siebenthal, 999.

Stratigraphic.

General: Hawthorth, 496.

Borings, Elmdale: Smith, 1005.

Chert gravels, eastern Kansas: Wooster, 1208.

Crystalline rocks: Hawthorth, 496.

Kaw Valley anticline: Warfel, 1132.

Underground water.

Ground water, Wichita area: Meitzer, 781.

Kaolin.

General: Hughes, 566.

Origin: Lindgren, 691; Watkins, 1142.

Appalachian States, southern: Watkins, 1142.

Kasaan Peninsula, Alaska: Wright, 1209.

Kenai Peninsula, Alaska: Martin *et al.*, 757.

Kentucky.*Economic.*

Barite: Watson and Grasty, 1148.

Coal, Clay County: Hodge, 537.

Drakesboro quadrangle: Crider, 277.

Dunmore quadrangle: Crider, 278.

Harlan field: Peck, 868; Sampson, 953.

Knox County: Hodge, 537.

Little Muddy quadrangle: Crider, 279.

Nortonville quadrangle: Crider, 276.

Perry County: Hodge, 536, 538.

Franklin County: Miller, 802.

Jefferson County: Butts, 182.

Oil and gas possibilities: Fohs, 414.

Soils: Averitt, 34.

Dynamic and structural.

Chestnut Ridge disturbance: Gardner, 430.

Mammoth Cave: Martel, 755.

Physiographic.

Jefferson County: Butts, 182.

Stratigraphic.

General: Fohs, 414.

Cynthiana formation: Miller, 804.

Drakesboro quadrangle: Crider, 277.

Dunmore quadrangle: Crider, 278.

Franklin County: Miller, 802.

Jefferson County: Butts, 182.

Little Muddy quadrangle: Crider, 279.

Mississippi Bluffs: Barry, 99.

Nortonville quadrangle: Crider, 276.

Paleontology.

Cynthiana formation: Miller, 804.

Kootenai, age: Berry, 102.

Lafayette formation: Shaw, 999.

Lake Lahontan, history: Gale, 427.

Lake Superior highlands, origin and age: Keyes, 633.

Lakes, glacial. *See* Glacial lakes.

Lamellibranchiata. *See* Pelecypoda.

Landalides.

Panama Canal Zone: MacDonald, 729.

Virginia, Mount Vernon: Darton, 310.

Lava.

- Ellipsoidal lavas, Prince William Sound,
Alaska: Capps, 199.
California, Sierra Nevada: Turner, 1084.
Hawaii: Cross, 281.

Lawton oil and gas field, Oklahoma: Wegemann
and Howell, 1162.

Leaching of Pleistocene drifts, Iowa: Leighton, 677.

Lead.

- Arizona: Helges, 503.
British Columbia, Cranbrook area: Schofield,
902.
California: Yale, 1218.
Central States: Butler and Dunlop, 177.
Colorado: Henderson, 509.
Eastern States: Dunlop, 381.
Idaho: Gerry, 439.
Missouri, Joplin district: Siebenthal, 999.
Montana: Helges, 506.
Nevada: Helges, 504.
New Mexico: Henderson, 507.
Oregon: Yale, 1218.
South Dakota: Henderson, 508.
Texas: Henderson, 507.
Utah: Helges, 505.
Washington: Gerry, 439.
Wisconsin: Wright, 1210.
Wyoming: Henderson, 506.

Lemuroidea, classification and phylogeny: Greg-
ory, 475.

Lignite. *See also Coal.*

- Alaska, Cook Inlet: Crane, 274.
Kachemak Bay region: Crane, 274; Parks,
863.

Lime.

- United States: Loughlin, 706.

Limestone solution on bottom of Lake Ontario:
Kindle, 646.

Lithology. *See Petrology.*

Llano Estacado, Texas: Baker, 38.

Loess.

- Origin, Indiana, southwestern: Shaw, 984.

Louisiana.**Economic.**

- Iron, northwestern Louisiana: Burchard, 159.
Salines, origin: Harris, 492; Norton, 847.

Lower Silurian. *See Ordovician.*

Magma. *See also Intrusions.*

- General: Daly, 303.
Anorthite-forsterite-silica system: Andersen, 17.
Crystallization: Bowen, 122.
Igneous rocks, evolution stages: Bowen, 123.
Lime-alumina-silica system: Rankin, 906.
Pressure in formation of rocks and minerals:
Johnston, 594.
Silicate liquids, differentiation: Bowen, 121.
Montana, Boulder batholith: Billingsley, 105.

Magmatic assimilation: Bascom, 77.

Magmatic differentiation.

- British Columbia, Franklin mining camp,
West Kootenay: Drysdale, 374.
Connecticut, Litchfield sulphide-bearing rocks:
Howe, 559.

Magnetite.

- California: Yale and Gale, 1220.
United States: Yale and Gale, 1220.

Magothy flora: Berry, 104.

Maine.**Dynamic and structural.**

Subsidence on coast, recent: Davis, 312.

Stratigraphic.

Glaciation, Mount Katahdin: Curtis, 291.

Mammalia.

General: Matthew, 767.

Amphicyon, dentition: Cook, 266.

Bears, origin: Gidley, 441.

Bison crassicornis skull: Holland, 540.

California, Mohave Desert: Merriam, 787.

North Coalinga region: Merriam, 788.

Tejon Hills: Merriam, 789.

Castoridae: Taylor, 1063.

Chlamytherium septentrionalis, Florida: Sel-
lards, 981.

Cynarctus, Nebraska: Barbour and Cook, 66.

Desmostylus: Hay, 498.

Oregon: McCormack, 726.

Diceratherium, Nebraska: Cook, 262.

Elephas hayi, Nebraska: Barbour, 61, 65.

Elotherium, Nebraska: Barbour, 45.

Eocene, lower: Matthew, 771.

Epiaphelops, Nebraska: Cook, 261.

Eusmilus, Nebraska: Barbour and Cook, 67.

Evolution: Matthew, 768.

Felidae: Barbour and Cook, 67.

Florida, southern: Sellards, 978.

Hipparion group, Pacific region: Merriam, 791.

Horses, Miocene and Pliocene, California: Mer-
riam, 792.

Hypopodius: Matthew, 769.

Hypohippus, Nebraska: Barbour, 61.

Lemuroidea, classification and phylogeny: Greg-
ory, 475.

Mammoth, Nebraska: Barbour, 47, 61, 65.

Sloux County, Nebraska: Cook, 264.

Marsupials, origin: Gidley, 440.

Mastodon, Cherry County, Nebraska: Barbour,
54.

Ithaca, New York: Sheldon, 991.

Tetralodon lull, Nebraska: Barbour, 63.

Megalocnus, Cuba: Torre and Matthew, 1075.

Multituberculata, affinities: Granger, 467.

Myiodon, Texas: Lull, 714.

Myrmecoboides, marsupial, Fort Union beds,
Montana: Gidley, 440.

Nebraska, Sloux County, catalog: Cook, 263.

Nevada, Astor Pass, Pleistocene: Merriam, 790.

Notharctus, Eocene lemur: Gregory, 477.

relationship: Gregory, 475.

Oregon, Pleistocene: McCormack, 726.

Pleistocene: Hay, 497.

Preptoceras, Texas: Troxell, 1080.

Proboscidea, round ligament: Barbour, 56.

Snake Creek beds, Nebraska: Sinclair, 1000.

Symbos cavitrons, Michigan: Case, 208.

Texas, Rock Creek: Troxell, 1079.

Tephrocyon, Nebraska: Cook, 265.

Tetralodon, Nebraska: Barbour, 54.

Wyoming, Niobrara County, Lance fauna:
Lull, 715.

- Mammoth Cave:** Martel, 755.
- Man, fossil.**
Pleistocene: Reeds, 917.
- Manganese.**
General: Joseph, 608.
Arizona: Joseph, 608.
Newfoundland: Dale, 298.
United States: Hewett, 516
- Manitoba.**
General.
Churchill River basin: McInnes, 734.
Nelson River basin: McInnes, 734.
Economic.
Clay: Keele, 619.
Gypsum: Wallace, 1129.
Salt: Wallace, 1129.
Shale: Keele, 619.
Stratigraphic.
General: Wallace, 1129.
Amisk Lake district: Bruce, 154.
Borings, Winnipeg: McLearn, 744.
Churchill River basin: McInnes, 734.
Nelson River basin: McInnes, 734.
Pembina Mountain: MacLean, 742.
Saskatchewan River valley: Kindle, 643.
Paleontology.
Saskatchewan River valley: Kindle, 643.
Underground Water.
Artesian water: Tyrrell, 1086.
- Map making.** *See* Cartography.
- Maps.** *See* Cartography and Geologic maps.
- Marble.**
Alabama: Prouty, 904.
Vermont, eastern: Dale, 299.
- Marshes.**
Salt marshes: Townsend, 1076.
- Martinique.**
Dynamic and structural.
Mont Pele, present condition: Hovey, 557.
- Maryland.**
Economic.
Barite: Watson and Grasty, 1148.
Stratigraphic.
Brandywine formation: Clark, 224.
Paleontology.
Miocene, Chesapeake Beach: Palmer, 862.
Pleistocene plants, Indian Head: Berry, 103.
- Massachusetts.**
Physiographic.
Buried river channels: Kemp, 624.
Stratigraphic.
Boston area, postglacial history: Shimer, 993.
Pre-Wisconsin glacial drift, Boston basin: Wentworth, 1170.
Paleontology.
Triassic, Connecticut Valley: Lull, 712.
Petrology.
Northfieldite, pegmatite, and pegmatitic schist: Emerson, 399.
- Mastodon.**
New York, Ithaca: Sheldon, 991.
- Meandering.**
General: Davis, 328.
- Meerschaum.**
New Mexico: Bush, 173.
- Meetings.** *See* Associations.
- Mercury.** *See* Quicksilver.
- Mesozoic (undifferentiated).**
Alaska, Broad Pass region: Moffit and Pogue, 812.
Ketchikan district: Wright, 1208.
Arizona, Santa Rita and Patagonia Mountains: Schrader, 964.
British Columbia, Beaverdell area: Reinecke, 920.
Castile gypsum and Rustler formation, age: Udden, 1005.
Yukon, upper White River district: Cairnes, 187.
- Metamorphism.**
General: Leith and Mead, 681.
Anamorphism: Leith and Mead, 683.
Convergence to mineral type in dynamic metamorphism: Leith and Mead, 683.
Volcanic tuffs: Pirsson, 883.
British Columbia, Golden-Kamloops: Daly, 302.
granite altered to garnet: Brock, 143.
Pass Creek: Brock, 144.
Nova Scotia, Halifax, contact metamorphism: McIntosh, 735.
Shelburne County: Powers, 891.
- Meteorites.**
General: Farrington, 404.
Catalog: Farrington, 405.
Composition: Merrill, 798.
Monticellite-like mineral: Merrill, 797.
Oldhamite: Merrill, 797.
Canyon Diablo, Arizona: Barringer, 74.
Fisher, Minnesota: Merrill, 795.
Gay Gulch, Yukon: Johnston, 598.
Sams Valley, Oregon: Foote, 416.
Skookum, Yukon: Johnston, 598.
- Mexico.**
Economic.
El Oro, San Rafael vein: Allan and Faulkner, 7.
Petroleum: Day *et al.*, 338; Garfias, 433; Huntley, 599; Stewart, 1051.
eastern Mexico: Dumble, 379.
Furbero field: DeGolyer, 341.
northeastern Mexico: Garfias, 434.
Tampico-Tuxpan region: DeGolyer, 343.
Preciousstones, Lower California: Wittich, 1202.
Santa Eulalia district, Chihuahua: Prescott, 899.
Dynamic and structural.
Colima, eruption: Waltz, 1122.
Earthquake, Acambay-Tixmadeje, Mexico: Urbina and Camacho, 1101.
Volcanoes: Waltz, 1122.
descending clouds: Waltz, 1123.
Physiographic.
Northeastern Mexico: Dumble, 378.
Stratigraphic.
Acambay-Tixmadeje, Mexico: Urbina and Camacho, 1101.
Cretaceous and Tertiary, eastern Mexico: DeGolyer, 342.
Eocene history, coastal area: Dumble, 390.
Furbero oil field: DeGolyer, 341.
Petroleum fields, northeastern Mexico: Garfias, 434.

Mexico—Continued.*Stratigraphic—Continued.*

Santa Eulalia district, Chihuahua: Prescott, 899.

Tertiary, northeastern Mexico: Dumble, 378.

Plateau region: Wittich, 1203.

Mineralogy.

Precious stones, Lower California: Wittich, 1202.

Mica.

Georgia: Galpin, 420.

United States: Sterrett, 1043.

Michigan.*Economic.*

Coal: Smith, 1015.

Copper: Hore, 551; Read, 914.

Iron, Crystal Falls: Ives, 576.

Mineral resources: Allen, 11.

Nonmetallic minerals: Smith, 1015.

Physiographic.

Shorelines, Mackinac Island: Taylor, 1062.

Stratigraphic.

Limestone Mountain, Houghton County: Case and Robinson, 210.

Pleistocene: Leverett and Taylor, 686.

Pre-Cambrian, Upper Peninsula: Allen and Barrett, 12.

Pre-Keweenaw formations, Gogebic range: Allen and Barrett, 13.

Paleontology.

Limestone Mountain, Houghton County: Case and Robinson, 210.

Symbos cavifrons: Case, 208.

Petrology.

Upper Peninsula: Allen and Barrett, 12.

Mineralogy.

Vanadium minerals, Lake Superior: Schaller, 968.

Microspectroscope: Wherry, 1081.

Mine waters.

Sulphide ores, mines: Hodge, 535.

Mineral paints.

United States: Hill, 524.

Mineral resources (*general*). *See Economic under the names of States.*

Mineral water.

United States: Dole, 362.

Mineralogy (*general*). *See also Meteorites; Technique. For regional, see names of States. For particular minerals, see list, p. 186.*

General: Bayley, 85; Clarke, 226.

Analyses of minerals: Clarke, 226.

Anhydrite, occurrence: Rogers, 944.

Anorthite-forsterite-silica system: Andersen, 17.

Bornite, composition: Wherry, 1177.

Calcite, crystal forms: Whitlock, 1184.

Classification according to occurrence: Wherry and Gordon, 1178.

Crystallographic intergrowths: Segall, 975.

Determination of gems: Moses, 830.

Feldspar, aegirine: Andersen, 18.

Feldspars, perthitic, quantitative study: Warren, 1135.

Footelite, identity with connellite: Ford and Bradley, 419.

Garnet group: Ford, 418.

Mineralogy—Continued.

Lime-alumina-silica system: Day, 334; Rankin, 906.

Microspectroscope: Wherry, 1176.

Muscovite: Steiger, 1038.

Turquoise: Pogue, 887.

Minerals described. *See list, p. 186.*

Minnesota.*General.*

Bibliography: Gregory, 479.

Economic.

Iron: Van Barneveld, 1102.

Cuyuna district: Cheney, 216.

Cuyuna ores: Appleby and Newton, 25.

manganiferous, Cuyuna Range: McCarty, 722.

Mesabi: Appleby and Newton, 24.

Mesabi Range: Wolff, 1204.

Physiographic.

Lake Agassiz: Upham, 1100.

Minneapolis, buried rock surface and preglacial river valleys: Soper, 1022.

Stratigraphic.

Cuyuna district: Cheney, 216.

Iron ranges: Van Barneveld, 1102.

Surface formations, northwestern Minnesota: Leverett, 685.

Mineralogy.

Meteorites, Fisher, Polk Co.: Merrill, 795.

Miocene. See Tertiary.

Miscellaneous. *See also Addresses.*

Display of United States Geological Survey at the Panama exposition: Anon., 1225.

Geology applied to dams and reservoirs: Glenn, 453.

Mississippi.*General.*

Fifth biennial report, 1914-15, of survey: Lowe, 708.

Economic.

General: Lowe, 709.

Physiographic.

General: Lowe, 709.

Stratigraphic.

General: Lowe, 709.

Cretaceous-Eocene contact: Stephenson, 1039.

Lafayette formation: Shaw, 989.

Paleontology.

Eoachras eocenica, Holmes County: Berry, 100.

Underground water.

General: Lowe, 709.

Mississippian. See Carboniferous.

Missouri.*General.*

Native silver in glacial material, Columbia: Tarr, 1060.

Report State geologist: Buehler, 157.

Economic.

Mineral resources: Buehler, 157.

Zinc and lead, Joplin district: Siebenthal, 999.

Dynamic and structural.

Deformation, Quaternary, southeastern Missouri: Shaw, 988.

Physiographic.

Deformation, Quaternary, southeastern Missouri: Shaw, 988.

Missouri—Continued.**Stratigraphic.**

Alexandrian series: Keyes, 631.

Borings: McCoy, 727.

Devonian, central Missouri: Branson and Greger, 134.

Pennsylvanian series: Hinds and Greene, 529

Paleontology.

Pennsylvanian flora: White, 1180.

Pennsylvanian, Invertebrata: Girty, 452.

Underground water.

Artesian water: McCoy, 727.

Moklavites: Wright, 1211.

Mollusca. See also Cephalopoda, Gastropoda, and Pelecypoda.

Florida, Tampa, Oligocene: Dall, 301.

Illinois, Pleistocene: Baker, 39.

Solenopsidae: Cockerell, 248.

Tertiary, Rocky Mountain region: Cockerell, 247.

Mollusckidea. See Brachiopoda and Bryozoa.

Molybdenum.

Arizona: Joseph, 609.

British Columbia, Lost Creek: Drysdale, 373.

Canada: Smith, 1016.

Monasite.

General: Kithlil, 649.

Montana.**Economic.**

Boulder batholith: Billingsley, 105.

Coal, Bull Mountain field: Rowe and Wilson, 952.

Copper, Butte: Thompson, 1065.

Gold, North Moccasin Mountains: Freeman, 422.

Mineral production, 1914: Helkes, 506.

North Moccasin Mountains: Freeman, 422.

Oil and gas probabilities: Rowe, 951.

Phillipsburg quadrangle: Calkins and Emmons, 190.

Replacement, Butte, Montana: Ray, 912.

Sapphire, Yogo: Freeman, 423.

Dynamic and structural.

Boulder batholith: Billingsley, 105.

Phillipsburg quadrangle: Calkins and Emmons, 190.

Physiographic.

Glacier National Park: Campbell, 191.

Mission Range: Davis, 332, 333.

Missouri River, Tertiary history: Bauer, 84.

Montana batholith: Billingsley, 105.

Phillipsburg quadrangle: Calkins and Emmons, 190.

Stratigraphic.

Boulder batholith: Billingsley, 105.

Cretaceous: Sternberg, 1042.

Glacier National Park: Campbell, 191.

Judith River formation: Bowen, 119.

Madden Rock: Adams and Dick, 3.

Montana group: Bowen, 119.

North Moccasin Mountains: Freeman, 422.

Phillipsburg quadrangle: Calkins and Emmons, 190.

Rosebud County, Porcupine dome: Bowen, 120.

Three Forks region: Haynes, 502.

Paleontology.

Cretaceous: Sternberg, 1042.

Montana—Continued.**Paleontology—Continued.**

Dryopteris, Judith River formation: Knowlton, 656.

Hesperornis: Shufeldt, 995.

Myrmecoboides, marsupial, Fort Union: Gidley, 440.

Montana group: Bowen, 119.

Moraines.

Indiana: Leverett and Taylor, 686.

Michigan: Leverett and Taylor, 686.

Morrison formation: Mook, 823; age: Berry, 102; Lee, 674; Lull, 713; Osborn, 845; Stanton, 1033; Invertebrate fauna: Stanton, 1033.

Mounds.

Origin, Mississippi Valley: Crook, 280.

National mining district, Nevada: Lindgren, 600.

Natural bridges.

Tennessee, Cumberland Mountains: Nelson, 837.

Natural gas.

General: Clapp *et al.*, 219; Hager, 484.

Connate water in oil and gas sands: Johnson, 596; Shaw, 986; Washburne, 1139.

Capillary concentration of oil and gas: Johnson *et al.*, 593; Washburne, 1138.

Origin: Clapp *et al.*, 219; White, 1182.

Dakota sand, oil, gas, and water content: Huntley, 568.

Illinois, Gillespie and Mt. Olive quadrangles: Lee, 672.

Greenville field: Blatchley, 112.

Kansas: Gould, 462.

Kentucky: Fols, 414.

Ohio, Cleveland: Van Horn, 1104.

Wooster field, Wayne County: Bonine, 117.

Oklahoma: Gould, 463; Shannon and Trout, 983.

Healdton field: Wegemann and Heald, 1161.

Lawton field: Wegemann and Howell, 1162.

Loco field: Wegemann, 1157.

Palo Pinto County: Wegemann, 1159.

Stephens County, Duncan field. Wegemann, 1158.

Stephens and Jefferson counties, Loco field: Wegemann, 1157.

Ontario: Malcolm, 750.

Texas, Palo Pinto County: Wegemann, 1159.

United States: Northrop, 845.

West Virginia, Logan and Mingo counties: Hennen and Reger, 511.

Wyoming and McDowell counties: Hennen and Gawthrop, 510.

Wyoming, Basin and Greybull fields: Hintze, 530.

Nebraska.**General.**

Geological survey, history: Barbour, 46.

Publications, Geological Survey: Barbour, 43.

Rocks of Nebraska: Barbour, 59.

Economic.

General: Barbour, 58.

Cement materials: Barbour, 49.

Clay: Barbour, 48.

Diatomite, Thomas County: Elmore, 396.

Nebraska—Continued.*Economic—Continued.*

- Mineral resources: Barbour, 44.
- Potash, northwestern Nebraska: Ziegler, 1224.
- Quartzite, green: Barbour, 57.
- Rocks of Nebraska: Barbour, 59.

Stratigraphic.

- Drift deposits: Barbour, 50.
- Pennsylvanian formations, southeastern Nebraska: Condra and Bengtson, 258.
- Sioux County: Cook, 267.
- Snake Creek beds, Sioux County: Sinclair, 1000.

Palaeontology.

- General: Barbour, 60.
- Amphicyon, dentition: Cook, 266.
- Carboniferous plant tissue: Barbour, 64.
- Cynarctus: Barbour and Cook, 66.
- Diatoms: Elmore, 397.
- Thomas County: Elmore, 396.
- Diceratherium: Cook, 262.
- Elephas hayi, Crete: Barbour, 61, 65.
- Elotherium: Barbour, 45.
- Eplaphelops: Cook, 261.
- Eusmilus: Barbour and Cook, 67.
- Eurypterus: Barbour, 52.
- Hypohippus: Barbour, 61.
- Mammoth: Barbour, 47, 61.
- Sioux County: Cook, 264.
- Mastodon, Cherry County: Barbour, 54, 63.
- Medusina, Carboniferous: Barbour, 53.
- Plant tissue, Carboniferous: Barbour, 55.
- Proboscidea, round ligament: Barbour, 56.
- Sioux County: Cook, 263.
- Snake Creek beds, Sioux County: Sinclair, 1000.
- Tephrocyon: Cook, 265.
- Testudo, Snake River Pliocene, Cherry County: Barbour, 62.

Petrology.

- Rocks of Nebraska: Barbour, 59.

Mineralogy.

- General: Barbour, 58.
- Minerals of Nebraska: Barbour, 58.

Nevada.*Economic.*

- Cave deposit, Battle Mountain: Young, 1222.
 - Cinnabar, western Nevada: Knopf, 653.
 - Columbus Marsh muds, composition: Hicks, 518.
 - Goldfield: Cutler, 295; Rickard, 932.
 - Gold, National district: Lindgren, 690.
 - Gold-platinum-palladium lode, Clark County: Knopf, 651.
 - Goodsprings district, Clark County: Nevius, 838.
 - Mineral Hill district, Eureka County: Maynard, 775.
 - Mineral production, 1914: Helkes, 504.
 - National district: Lindgren, 690.
 - Northwestern Nevada: Hill, 520.
 - Platinum, Boss mine, Yellow Pine district: Kennedy, 628.
 - Platinum-gold lode, Yellow Pine district: Knopf, 652.
 - Silver, Mineral Hill district, Eureka County: Maynard, 775.
 - Tonopah: Spurr, 1029.
- Dynamic and structural.*
- Basin Range faulting: Louderback, 700.

Nevada—Continued.*Dynamic and structural—Continued.*

- Earthquake, Pleasant Valley: Jones, 605.
- Tufas of Lake Lahontan, origin: Jones, 606.

Physiographic.

- Lake Lahontan: Jones, 606.
- history: Gale, 427.

Stratigraphic.

- National district: Lindgren, 690.
- Northwestern Nevada: Hill, 520.
- Tonopah: Spurr, 1029.

Palaeontology.

- Hipparion group: Merriam, 791.
- Mammals, Pleistocene, Astor Pass: Merriam, 790.

Mineralogy.

- Plumbogorite, Yellow Pine district: Knopf, 655.

Underground water.

- Big Smoky Valley: Meinzer, 782.
- Southeastern Nevada: Carpenter, 204.

New Brunswick.*General.*

- Moncton area: Wright, 1217.

Stratigraphic.

- Ordovician, St. John: McLearn, 745.
- St. John area: Hayes, 500.
- Triassic: Powers, 894.

Palaeontology.

- Ordovician, St. John: McLearn, 745.

Newfoundland.*Economic.*

- Iron: McDonald, 730.
- Wabana region: Hayes, 499.
- Manganese, Conception and Trinity bays: Dale, 298.

Stratigraphic.

- Conception and Trinity bays: Dale, 298.
- Wabana iron region: Hayes, 499.

New Hampshire.*Dynamic and structural.*

- Lost River: Goldthwait, 459.

Physiographic.

- Lost River: Goldthwait, 459.
- Peneplain, White Mountains: Goldthwait, 460.

Stratigraphic.

- Tillite, Sugar Hill: Sayles, 956.

New Jersey.*Economic.*

- General: Lewis and Kummel, 687.

Dynamic and structural.

- Coast erosion: Johnson and Smith, 589.

Stratigraphic.

- General: Lewis and Kummel, 687.

Mineralogy.

- Datolite, Great Notch: Cook and Kraus, 260.
- Somerset County: Hawkins, 494.

New Mexico.*General.*

- Syllabus of geology: Keyes, 642.

Economic.

- Copper, Burro Mountains: Somers, 1021.
- Gold, Pinos Altos district: Bush, 170.
- Gypsum, Tularosa Basin: Meinzer and Hare, 784.
- Meerschaum: Bush, 173.
- Mineral production, 1914: Henderson, 507.

New Mexico—Continued.**Economic—Continued.**

Mineral resources: Jones, 603.

Mining map: Jones, 603.

Pinos Altos district: Bush, 170; Wright, 1215.

Red River district, Toas County: Bush, 171.

Steeple Rock district, Grant County: Bush, 172.

Dynamic and structural.

Arid erosion, measure of: Keyes, 641.

Coal fields, structural features: Kirk, 648.

Physiographic.

Tularosa Basin: Meinzer and Hare, 784.

Stratigraphic.

Burro Mountains: Somers, 1021.

Cretaceous, Rocky Mountain region: Lee, 673.

Morrison formation: Darton, 309.

Syllabus of geology: Keyes, 642.

Tularosa Basin: Meinzer and Hare, 784.

Paleontology.

Gastropoda, Tertiary: Cockerell, 244.

Permian Reptilia: Williston, 1194.

Triassic Reptilia: Huene, 545; Mehl, 780.

Wasatch fauna: Matthew and Granger, 773.

Petrology.

Burro Mountains: Somers, 1021.

Underground water.

Tularosa Basin: Meinzer and Hare, 784.

New York.**General.**

John Boyd Thacher Park: Kunz, 660, 661.

Report of State geologist: Clarke, 230.

Economic.

Mining and quarry industry, 1914: Newland, 839.

Molding sand, Albany: Newland, 840, 841.

Dynamic and structural.

Chimney Mountain rift, Adirondack Mountains: Miller, 809.

Deformation, post-Ordovician, St. Lawrence Valley: Chadwick, 211.

Intraformational contorted strata, Trenton Falls: Miller, 808.

Physiographic.

Buried river channels: Kemp, 624.

Catskill Mountains, northern: Rich, 925.

Glaciation, Syracuse region: Brigham, 140; Clarke, 234.

Interglacial gorges of Six Mile Creek, Ithaca: Rich and Filmer, 927.

Mohawk Valley, fault-block topography: Roobach, 948.

Stratigraphic.

General: Clarke, 230.

Adirondack region, igneous rocks, age: Cushing 283.

Glaciation, Catskill Mountains, northern: Rich, 925.

Helderberg escarpment, Albany County: Darton, 306.

Hamilton, western New York: Grabau, 465.

New York City: Berkey, 95.

St. Lawrence Valley: Chadwick, 211.

Paleontology.

Fish fauna, Eighteen-Mile Creek: Hussakof and Bryant, 570.

Mastodon, Ithaca, New York: Sheldon, 991.

New York—Continued.**Mineralogy.**

Amazon stone, North White Plains: Burr, 166.

Niagara Falls.

Age: Martin, 762; Spencer, 1027.

Nickel.

Ontario, Sudbury, origin: Coleman, 254.

Nitrate.

Idaho, southern: Mansfield, 752.

Oregon, eastern: Mansfield, 752.

Nomenclature. See also under Stratigraphic.

Cambrian: Walcott, 1124.

Geologic surfaces: Johnson, 591.

North Carolina.**General.**

Report State geologist, 1912-14: Pratt, 896.

Economic.

Barite: Watson and Grasty, 1148.

Gold, Coggins mine, Montgomery County: Pratt, 897.

Iron, magnetic ores, Ashe County: Pratt, 898.

Paleontology.

Duplin fauna: Gardner, 432.

Waccamaw fauna: Gardner, 432.

Yorktown fauna: Gardner, 432.

Petrology.

Igneous rocks, Mount Collier: Smith, 1011.

Soils: Plummer, 885.

North Dakota.**Stratigraphic.**

Cannonball member of Lance formation: Lloyd and Hares, 696.

Paleontology.

Notharctus, Eocene lemur: Gregory, 477.

relationship: Gregory, 475.

Northwest Territories.**General.**

General: Cammell, 194.

Coppermine country: Tyrrell, 1080.

Stratigraphic.

General: Cammell, 194.

Nova Scotia.**General.**

Caledonia area, Queens County: Faribault, 403.

Economic.

Iron stone, Halifax: Vickery, 1119.

Physiographic.

General: Goldthwait, 458.

Stratigraphic.

Carboniferous: Hyde, 572.

Horton-Windsor area: Bell, 94.

Shelburne County: Powers, 891.

Triassic: Powers, 894.

Petrology.

Granite contact zone, Halifax: McIntosh, 735.

Shelburne County: Powers, 891.

Ocala limestone, age: Cooke, 268.

Ohio.**Economic.**

Building stones: Bownocker, 126.

Coal: Burrows, 167.

Columbus quadrangle: Hubbard *et al.*, 562.

Natural gas, Cleveland: Van Horn, 1104.

Wooster field, Wayne County: Bonline, 117.

Ohio—Continued.*Economic*—Continued.

Petroleum, Wooster field, Wayne County: Bonine, 117.

Physiographic.

Columbus quadrangle: Hubbard *et al.*, 562.
Dayton: Foerste, 413.

Stratigraphic.

General: Bownocker, 126.
Berea grit, unconformity at base: Cushing, 294.
Berea-Bedford unconformity: Cushing, 294.
Columbus quadrangle: Hubbard *et al.*, 562.
Dayton: Foerste, 413.
Olentangy shale, central Ohio: Grabau, 464.
northern Ohio: Stauffer, 1036.
Stream channels at base of Pennsylvanian, in southeastern Ohio: Schroyer, 967.
Waverly: Hyde, 573.
Wooster area, Wayne County: Bonine, 117.

Paleontology.

Ichthyocanthus platypus, Coal Measures: Moodie, 814.

Oil. *See* Petroleum.

Oil shales, regional alteration: White, 1181.

Oil reserves, estimation: Washburne, 1136.

Oklahoma.*General*—

Bibliography: Trout and Myers, 1077.

Economic.

Copper, in "red beds": Fath, 406.
Granite: Taylor, 1061.
Lawton oil and gas field: Wegemann and Howell, 1162.
Natural gas: Gould, 462; Shannon and Trout, 983.
Duncan field, Stephens County: Wegemann, 1158.
Lawton field: Wegemann and Howell, 1162.
Looe field, Stephens and Jefferson counties: Wegemann, 1157.
Northeastern Oklahoma: Snider, 1019.
Oil fields, geological features: Hager, 483.
Petroleum, Gardner, 431; Gould, 462; Shannon and Trout, 983.
Healdton field, Carter County: Wegemann and Heald, 1161.
Lawton field: Wegemann and Howell, 1162.
Wapanucka limestone: Wallis, 1130.
Zinc and lead, Joplin district: Siebenthal, 999.

Physiographic.

General: Wallis, 1130.
Northeastern Oklahoma: Snider, 1019.

Stratigraphic.

General: Shannon and Trout, 983; Wallis, 1130.
Cotton and Jefferson counties: Wegemann, 1156.
Healdton oil field, Carter County: Wegemann and Heald, 1161.
Morrow group: Mather, 763.
Northeastern Oklahoma: Snider, 1019.
Wapanucka limestone: Wallis, 1130.

Paleontology.

Chester group: Snider, 1020.
Morrow group fauna: Mather, 763.
Trimerorhachis: Williston, 1195.
Wewoka fauna: Girty, 448.

Petrology.

Granite: Taylor, 1061.

Oligocene. *See* Tertiary.

Ontario.*General.*

Lake Huron region: Collins, 257.

Economic.

Clay: Keele, 618.
Corundum: Barlow, 68.
Devonian, southwestern Ontario: Stauffer, 1035.
Gold, Kowkash area: Hopkins, 550.
Porcupine district: Whitman, 1185.
pre-Cambrian: Tyrrell, 1087.
Mercury in Cobalt ores: Clevenger, 238.
Natural gas: Malcolm, 750.
Peat: Anrep, 23.
Petroleum: Malcolm, 750.
Porcupine, occurrence of gold: Tyrrell, 1091.
Radioactive minerals: Brunton, 155.
Pre-Cambrian ores: Miller and Knight, 807.
Road materials: Reinecke, 922.
Sesekimaka: Spearman, 1026.
Silurian, southwestern Ontario: Williams, 1189.
Sudbury nickel deposits, origin: Coleman, 254.
Sudbury ores: Walker, 1128.

Physiographic.

General: Kindle and Burling, 647.
Rainy River district: Johnston, 599.

Stratigraphic.

General: Malcolm, 750.
Canadian shield, Proterozoic: Coleman, 252.
Devonian, southwestern Ontario: Stauffer, 1035.
Eramosa beds, Niagara formation: Williams, 1191.
Interglacial period, earliest: Coleman, 255.
Ordovician, Lake Timiskaming: Williams, 1190.
Pre-Cambrian, classification: Miller and Knight, 806.
Rainy River district, surface geology: Johnston, 599.
Silurian, southwestern Ontario: Williams, 1189.
Structural relations, pre-Cambrian and Paleozoic rocks: Kindle and Burling, 647.

Paleontology.

Agelacrinites: Raymond, 913.
Eurypterid fauna, Niagara formation: Williams, 1191.
Pelecypod, Ottawa: Wilson, 1096.

Petrology.

Central Ontario: Barlow, 68.
Nephelite syenite, Haliburton County: Foye, 421.
Sesekimaka: Spearman, 1026.

Mineralogy.

Radioactive minerals: Brunton, 155.

Oolite.

Origin: Wallis, 1130.
Pennsylvania, Bethlehem: Wherry, 1175.

Ordovician.*Stratigraphy.*

Intraformational contorted strata, Trenton Falls: Miller, 808.
Canada, St. Lawrence Valley: Kindle and Burling, 647.
Colorado, Castle Rock quadrangle: Richardson, 931.
Cynthiana formation: Miller, 804.

Ordovician—Continued.**Stratigraphy—Continued.**

- Indiana, Richmond beds: Coryell, 270.
 Kentucky, Franklin County: Miller, 802.
 Jefferson County: Butts, 182.
 Manitoba: McInnes, 734.
 Michigan, Houghton County, Limestone Mountain: Case and Robinson, 210.
 New Brunswick, St. John: McLearn, 745.
 Newfoundland, Bell Island: Hayes, 490.
 New Jersey: Lewis and Kummel, 687.
 New York, St. Lawrence Valley: Chadwick, 211.

Ohio: Bownocker, 126.

Oklahoma: Wallis, 1130.

northeastern: Snider, 1019.

Ontario: Malcolm, 750.

Lake Timiskaming: Williams, 1190.

Virginia, Roanoke County: Powell, 890.

Paleontology.

- Agelacrinites, Canadian: Raymond, 913.
 Cynthiana formation, fauna: Miller, 804.
 Indiana, Richmond beds: Coryell, 270.
 Kentucky, Franklin County: Miller, 802.
 Michigan, Houghton County, Limestone Mountain: Case and Robinson, 210.
 New Brunswick, St. John: McLearn, 745.
 Ontario, Ottawa, pelecypod: Wilson, 1197.
 Virginia, Athens shale, graptolites: Powell, 890.

Ore deposits, origin. For ore deposits in general see Economic (general).

- General: Daly, 303; Rogers, 942.
 Colloidal gold and silver: Bastin, 80.
 Colloidal migration: Clark, 222.
 Composition of waters in mines of sulphide ores: Hodge, 535.
 Contact metamorphic ore deposits: Prescott, 900.
 Crystallographic intergrowths: Segall, 975.
 Fractional precipitation of ore-forming compounds: Wells, 1166.
 Metallogenetic epochs, pre-Cambrian, Ontario: Miller and Knight, 806.
 Ore deposits and intrusive bodies in Utah: Butler, 175.
 Ore deposits in sedimentary formations: Pirsson, 882.
 Organic origin of mineral deposits in unaltered Paleozoic sediments: Van Ingen, 1106.
 Physiographic changes and ore alterations: Atwood, 32.
 Quartz veins in lamprophyre intrusions: McLennan, 747.
 "Sandstone" ore deposits: Kennan, 627.
 Secondary enrichment, Gilpin County, Colorado: Bastin, 81.
 Sulphide enrichment: Young, 1200.
 Temperatures in zones of chalcocitization: Emmons, 401.
 Bauxite, Arkansas: Mead, 776.
 British Columbia, Beaverdell area: Reinecke, 920.
 Rossland: Drysdale, 375.

Ore deposits, origin—Continued.

- Carnotite deposits: Kennan, 626.
 Colorado, Gilpin County: Bastin, 81; Bastin and Hill, 83.
 Red Cliff region: Means, 777.
 Copper, Alaska: Wright, 1209.
 Bornotite as silver precipitant: Palmer, 860.
 British Columbia, Rossland: Drysdale, 375.
 Chalcocite in ore deposits: Graton, 468.
 Chalcocite occurrence: Graton *et al.*, 468.
 Covellite, occurrence: Eakle *et al.*, 391.
 Enrichment: Day, 334, 335.
 Idaho, Cour d'Alene: Huston, 571; Ray, 911.
 In "red beds" of Oklahoma: Fath, 406.
 Michigan: Hore, 551.
 Montana, Butte: Thompson, 1065.
 New Mexico, Burro Mountains: Somers, 1021.
 Santo Domingo, San Cristobal: Donnelly, 363.
 Sulphides: Posnjak *et al.*, 888.
 Utah, Bingham Canyon: Beeson, 93.
 Cuba, Daiquiri: Lindgren and Ross, 695.
 Gold, California, Klamath Mountains: Ferguson, 409.
 Nevada, National district: Lindgren, 690.
 Iron, bog ores: Dake, 297.
 Cuba, Daiquiri district: Kemp, 623.
 Cuba, eastern: Leith and Mead, 682.
 Minnesota: Van Barneveld, 1102.
 Newfoundland, Wabana region: Hayes, 490.
 Oriskany ores, Virginia: Weld, 1163.
 Residual ores, formation and distribution: Dake, 290.
 Lead, Joplin region: Siebenthal, 999.
 Lead and zinc, Mississippi Valley: Spurr, 1028.
 Manganese, Newfoundland: Dale, 298.
 Mexico, Chihuahua, Santa Eulalia district: Prescott, 899.
 Montana, Boulder batholith: Billingsley, 105.
 Philipsburg quadrangle: Calkins and Emmons, 190.
 Nevada, Tonopah: Spurr, 1029.
 Nickel, Sudbury, Ontario: Coleman, 254.
 Sericite: Rogers, 945.
 Silver, enrichment experiments: Ravicz, 910.
 In argentiferous galena ores: Nissen and Hoyt, 842.
 Utah, Tintic district: Crane, 272, 273; Lindgren, 692.
 Washington, Skykomish basin: Smith, 1018.
 Zinc, Joplin region: Siebenthal, 999.
 Oxidized ores, formation from sulphide: Wang, 1131.
 Tennessee, Union County: Nason, 835.
 Ore shoots. See Economic geology, and Ore deposits, origin.

Oregon.**General.**

- Report of survey: Oregon B. M. and G., 851.
 Survey: Williams, 1188.

Economic.

- Mineral production, 1914: Yale, 1218.
 Mineral resources: Oregon B. M. G., 852.
 Nitrate deposits, eastern Oregon: Mansfield, 752.

Oregon—Continued.***Paleontology.***

- Desmostylus: Hay, 498.
 Hipparion group: Merriam, 791.
 Pleistocene Mammalia: McCormack, 726.
 Umpqua fauna: Dickerson, 350.

Mineralogy.

- General: Mitchell, 810.
 Meteorite, Sams Valley, Jackson County:
 Foote, 416.

Orogeny.

- Cordilleras: Lindgren, 689; Ransome, 907.
 Pacific coast region: Diller, 352.
 Rifted relict-mountain: Clarke, 233.

Oscillation. *See* Changes of level.**Ostracoda.** *See* Crustacea.**Paint.** *See* Mineral paints.**Paleobotany.**

- Antholithes, Florissant, Colorado: Cockerell:
 241.
 Arctic regions, Ellesmere Land, Tertiary:
 Nathorst, 836.
 British Columbia, Kootenay Valley, Ficus:
 Hollick, 542.
 Pleistocene: Schofield, 962.
 Carboniferous plant tissue, Nebraska: Barbour,
 64.
 Canada: Wilson, 1199.
 Cretaceous, southern New York and New Eng-
 land: Berry, 104.
 Cycads, phylogeny: Chamberlain, 212.
 Dryopteris, Judith River formation: Knowlton,
 656.
 Eocharas eocenica, Mississippi: Berry, 100.
 Equisetum, Florissant: Cockerell, 243.
 Ficus, British Columbia: Hollick, 542.
 Interglacial, Kootenay Valley, British Colum-
 bia: Hollick, 543.
 Herbaceous plants, evolution: Sinnott and
 Bailey, 1002.
 Indiana, Bloomington quadrangle, Carbonif-
 erous: Jackson, 577.
 Kentucky, Mississippi Bluffs, Pleistocene:
 Berry, 99.
 Magothy flora: Berry, 104.
 Missouri, Pennsylvania: White, 1180.
 Myrtaceae, origin and distribution: Berry, 101.
 Nebraska, plant tissue, Carboniferous: Barbour,
 55.
 Plagiopodopsis, Florissant: Britton and Hollick,
 141.
 Platanus, geologic history: Berry, 97.
 Pleistocene plants, Indianhead, Maryland:
 Berry, 103.
 Raritan flora: Berry, 104.

Paleoclimatology.

- General: Matthew, 768.
 Glacial anticyclone: Hobbs, 532.
 Herbaceous plants, evolution: Sinnott and
 Bailey, 1002.
 Paleobotanical evidence: Bailey and Sinnott,
 36.
 Permo-Carboniferous: Case, 206.
 Pleistocene: Hollick, 542.
 Pre-Cambrian: Coleman, 256.
 Volcanic dust veils: Arctowski, 26.

Paleogeographic maps.

- General: Pirsson and Schuchert, 884.
 Alberta, Cretaceous: Dowling, 370.
 Cambrian: Walcott, 1124.
 Cretaceous, Alberta: Dowling, 370.
 Pacific coast region, Cretaceous: Diller, 353.
 Permo-Carboniferous: Case, 206.

Paleogeography. *See also* Geologic history, Paleo-
climatology, and Paleogeographic maps.

- General: Schuchert, 974.
 Alberta, Cretaceous: Dowling, 370.
 Cambrian: Walcott, 1124.
 Canada, Paleozoic: Kindle and Burling, 647.
 Cretaceous, Alberta: Dowling, 370.
 Rocky Mountain region: Lee, 673.
 Devonian: Clarke, 231; Grabau, 463.
 Ohio, northeastern: Cushing, 294.
 Oriskany-Ple d'Aurore episode: Clarke, 232.
 Permo-Carboniferous: Case, 206.

Paleometeorology. *See* Paleoclimatology.**Paleontology (general).** *See also the classes of
animals and Paleobotany. For strati-
graphic see the different systems. For re-
gional see names of States.*

- General: Anon., 1227.
 Amphibia, methods of study: Moodie, 821.
 Aqueous habitats: O'Connell, 848.
 Criteria for determining time relations: Matthew
et al., 774.
 Origin of single characters: Caborn, 853.
 Pacific coast region: Merriam, 786.
 Popularization: Burling, 164.
 Skiagraphy of fossils: Field, 412.

Paleozoic (undifferentiated).

- Alaska, Gravina Island: Smith, 1012.
 Ketchikan district: Wright, 1209.

Panama.***Dynamic and structural.***

- Earthquake phenomena: MacDonald, 728.

Physiographic.

- Canal Zone: MacDonald, 729.

Stratigraphic.

- Canal Zone: MacDonald, 729.

Paleontology.

- Alga, Canal Zone: Howe, 560.

Paragenesis of minerals.

- Connecticut, Litchfield sulphide-bearing rocks:
 Howe, 559.
 Montana, Butte: Thompson, 1065.

Peat.

- Ontario: Anrep, 23.
 Quebec: Anrep, 23.
 United States: Davis, 317.
 Wisconsin: Huels, 564.

Pebbles.

- Deformed, in ancient conglomerates: Clarke,
 236.
 Scratched pebbles in ancient conglomerates:
 Clarke, 236.
 Shape: Gregory, 470.

Pelecypoda. *See also* Mollusca.

- Macrida, Pacific Coast: Packard, 856.
 Ontario, Ottawa, Ordovician: Wilson, 1197.
 Tejon fauna: Dickerson, 348.
 Union, Tertiary, Wyoming: Cockerell, 245.

Pennsylvanian.

- Driftless area: Trowbridge, 1073.
- Lake Superior highlands: Keyes, 633.
- Wyoming, western: Blackwelder, 108.

Pennsylvania.*Economic.*

- Barite: Watson and Grasty, 1148.
- Graphite: Miller, 805.
- Mineral production, 1911: Pa. T. G. S., 869.
- Mineral production, 1913: Hice, 517.

Dynamic and structural.

- Chestnut Ridge disturbance: Gardner, 430.
- Faulting, South Mountain: Stose, 1063.
- Oolite, Bethlehem: Wherry, 1175.

Physiographic.

- Buried river channels: Kemp, 624.

Stratigraphic.

- Geologic map, southwestern Pennsylvania: Pa. T. G. S., 870.

Pre-Cambrian, Piedmont region: Bascom, 76.

Paleontology.

- Trochoceras grovaniense: Mook, 825.

Petrology.

- Oolite, Bethlehem: Wherry, 1175.

Pennsylvanian. *See* Carboniferous.

Pentremites. *See* Blastoides.

Permian. *See* Carboniferous.

Petroleum.

- General: Clapp *et al.*, 219; Hager, 481.
- Accumulation near outcrop: Pepperberg, 871.
- Capillary concentration of oil and gas: Johnson *et al.*, 593; Washburne, 1138.
- Chlorides in oil field waters: Washburne, 1137.
- Connate water in oil and gas sands: Johnson, 590; Shaw, 986; Washburne, 1139.
- Dakota sand, oil, gas, and water content: Huntley, 568.
- Fuel oil in Southwest: Phillips, 880.
- Oil in an igneous rock: Udden, 1096.
- Oil reserves, estimation: Washburne, 1136.
- Origin: Clapp *et al.*, 219; White, 1181, 1182.
- Oklahoma, Healdton field: Wegemann and Heald, 1161.
- Quality and deformation, relation: Johnson, 592.

Alaska: Brooks, 145.

Alberta: Dowling, 368, 369; Slipper, 1004.

California: McLaughlin and Waring, 741.

San Joaquin Valley, west border: Anderson and Pack, 21.

Santa Maria district: Prutzman, 905.

Ventura County, South Mountain field: Hager, 482.

Colorado, Florence field: Foote, 415.

Illinois, Allendale field: Rich, 924.

Bond, Macoupin, and Montgomery counties: Blatchley, 112.

Colmar field: Morse and Kay, 829.

Gillespie and Mount Olive quadrangles: Lee, 672.

Indiana: Barrett, 73.

Kansas: Gould, 462.

Kentucky: Fohs, 414.

Mexico: Day *et al.*, 338; Garfias, 433, 434; Huntley, 569; Stewart, 1051.

eastern: Dumble, 379.

Furber field: DeGolyer, 341.

Tampico-Tuxpam field: DeGolyer, 343.

Petroleum—Continued.

Ohio, Wooster field, Wayne County: Bonine, 117.

Oklahoma: Gardner, 431; Gould, 462; Hager, 483; Shannon and Trout, 983.

Healdton field: Wegemann and Heald, 1161.

Lawton field: Wegemann and Howell, 1162.

southern: Gardner, 431.

Ontario: Malcolm, 750.

Southwest: Phillips, 880.

Tennessee, Onelda: Glenn, 455.

Texas: Dumble, 379.

Trinidad: Cadman, 185.

United States: Arnold, 28; Northrop, 846.

Washington: Weaver, 1149.

West Virginia, Boone County: Krebs and Teets, 659.

Logan and Mingo counties: Hennen and Reger, 511.

Wyoming and McDowell counties: Hennen and Gawthrop, 510.

Wyoming, Basin and Greybull fields: Hintze, 530.

Petrology (general). *See also* Igneous and volcanic rocks; Technique. *For regional see names of States. For rocks described, see list, p. 196.*

General: Bayley, 85; Clarke, 226.

Analyses of rocks: Clarke, 226.

Calcium orthosilicate in norm of igneous rocks: Washington, 1140.

Correlation of potassium and magnesium, sodium and iron in igneous rocks: Washington, 1141.

Feldspars, perthitic, quantitative study: Warren, 1135.

Gneiss, origin: Meunier, 801.

Igneous rocks, evolution stages: Bowen, 123.

Manual of petrographic methods: Johannsen, 584.

Moldavites: Wright, 1211.

Nomenclature: Butler, 181.

Polarizer in petrographic microscope: Wright, 1214.

Pressure in formation of rocks and minerals: Johnston, 594.

Quantitative classification: Cross, 282.

Slide rule in rock analyses: Hance, 487.

Spherulites: Wright, 1211.

Volcanic tuffs: Pirsson, 883.

Phillipsburg folio, Montana (no. 196): Calkins and Emmons, 190.

Phosphate.

General: Adams and Dick, 3.

Origin, Rocky Mountain deposits: Blackwelder, 110.

Florida, southern: Sellards, 978.

Montana, Phillipsburg quadrangle: Calkins and Emmons, 190.

Rocky Mountain deposits, origin: Blackwelder, 110.

Tennessee: Hook, 547.

Johnson County: Watkins, 1145.

United States: Phalen, 876; Waggaman and Fry, 1121.

Physiographic (general). *For regional see under the various States. See also* Drainage changes.

General: Am. Geog. Soc., 15; Schuchert, 974.

Physiographic—Continued.

- Arid lands: Davis, 329.
 Basin range structure: Keyes, 637.
 Block diagrams: Lobeck, 697.
 Bolsons: Tolman *et al.*, 1073.
 Cirques and U-shaped mountain valleys: Coleman, 251.
 Desert profiles: Lawson, 671.
 Desert regions: Lawson, 671.
 Driftless area: Trowbridge, 1078.
 False fault-scarps of desert ranges: Keyes, 637.
 Flords, nature and origin: Johnson, 588.
 Hemicones: Decker, 340.
 Lake Erie region, recent crustal movements: Decker, 339.
 Lake Superior highlands, origin and age: Keyes, 633.
 Mountain structures in plains: Keyes, 639.
 Naturalistic relief models: Curtis, 292.
 Pacific coast region: Diller, 352; Holway, 544.
 Physiographic changes and ore alterations: Atwood, 32.
 Representation of topographic forms: Matthes, 765.
 Rifted relict mountain: Clarke, 233.
 Rocky Mountains, Cretaceous-Tertiary time: Ashley, 31.
 Transcontinental excursion, 1912: *Am. Geog. Soc.*, 15.
 Transcontinental guidebook: Davis, 323.
 United States: Davis, 323.
 U-shaped mountain valleys: Coleman, 251.
 Valley-fill, Great Basin region: Keyes, 634.
 Wind gaps: Miller, 803.

Phytosauria, Triassic: Mehl, 778.

Pisces.

- Crossopterygia: Moodie, 820.
 Dipteris remains, Devonian, Colorado: Eastman, 392.
 New York, Eighteen-Mile Creek, Devonian: Hussakof and Bryant, 570.
 Tetrapoda, origin: Gregory, 474.

Placers. *See* Gold.

Planetesimal hypothesis: Chamberlin, 214.

Plants, fossil. *See* Paleobotany.

Platinum.

- Nevada, Yellow-Pine district, Boss mine: Kennedy, 628.
 United States: Hill, 522.

Pleistocene. *See* Glacial geology; Quaternary.

Pliocene. *See* Tertiary.

Polyzoa. *See* Bryozoa.

Poposaurus gracilis, Triassic, Wyoming: Mehl, 779.

Portland cement. *See* Cement.

Porto Rico.*General.*

General: Fenner, 408.

Economic.

General: Berkey, 96.

Physiographic.

General: Berkey, 96.

Stratigraphic.

General: Berkey, 96.

Petrology.

General: Berkey, 96.

Potash:

- General: Heriot, 512.
 Evaporation of brines: Hicks, 519.
 Muscovite as a source of potash: Steiger, 1038.
 Nebraska, northwestern: Ziegler, 1224.
 Tailings, potash in: Butler, 174.
 Texas: Phalen, 875; Phillips, 881; Udden, 1094.
 United States: Phalen, 875, 878.
 Utah, Marysville and Beaver, alunite: Loughlin, 701.

Potholes.

New Hampshire, Lost River: Goldthwait, 459.

Potomac group, age: Berry, 102.

Pre-Cambrian.*Stratigraphy.*

- General: Schuchert, 973.
 Algal remains: Walcott, 1126.
 Classification: Adams, 1; Coleman, 250.
 Correlation: Lane, 667.
 Nomenclature: Lane, 667.
 Arizona, Ray quadrangle: Ransome, 909.
 British Columbia, Cranbrook area: Schofield, 962.
 Golden-Kamloops: Daly, 302.
 Selkirk Mountains: Burwash, 169; Coleman, 250.
 Canada, Proterozoic: Coleman, 252.
 St. Lawrence Valley: Kindle and Burling, 647.
 Canadian shield, Archeozoic: Adams, 1.
 Colorado, Castle Rock quadrangle: Richardson, 931.
 Red Cliff region: Means, 777.
 Cordilleras: Lindgren, 689.
 Lake Superior region: Allen and Barrett, 12.
 Manitoba: McInnes, 734.
 Michigan: Hore, 551.
 Gogebic range: Allen and Barrett, 13.
 Upper Peninsula: Allen and Barrett, 12.
 Minnesota: Van Barneveld, 1102.
 Montana, Phillipsburg quadrangle: Calkins and Emmons, 190.
 Newfoundland, southeastern: Dale, 298.
 New Jersey: Lewis and Kummel, 687.
 New Mexico, Burro Mountains: Somers, 1021.
 New York, Adirondack region: Cushing, 293.
 New York City: Berkey, 95.
 Nova Scotia, Shelburne County: Powers, 891.
 Ontario: Miller and Knight, 806, 807; Tyrrell, 1087.
 Pennsylvania, Piedmont region: Bascom, 76.
 Quebec, Beauce County: Tyrrell, 1088.
 Saskatchewan: McInnes, 734.
 Utah, Cottonwood-American Fork region: Butler and Loughlin, 178.
 Wisconsin, northern: Allen and Barrett, 12.
Paleontology.
 General: Schuchert, 973.
 Algal remains: Walcott, 1126.
 Algonkian bacteria: Walcott, 1125.
Precious stones. *See also* Diamonds; Sapphires; Turquoise.
 United States: Sterrett, 1044.
Pressure in formation of rocks and minerals: Johnston, 594.
Primates. *See* Mammalia.

Pyrite.

United States: Phalen, 877.

Pyrophyllite.

British Columbia, Kyuquot Sound: Clapp, 217.

Quartzite.

Nebraska, Barbour, 57.

Quaternary. *See also* Glacial geology.**Stratigraphy.**

General: Osborn, 854.

Alaska, Willow Creek district: Capps, 197.

Brandywine formation, Atlantic Coastal Plain: Clark, 224.

California, Mohave Desert: Merriam, 787.

Colorado, North Park: Beekly, 92.

Driftless area: Trowbridge, 1078.

Florida, phosphate districts: Matson, 764.

Georgia, Coastal Plain: Stephenson and Veatch, 1041.

Illinois, Belleville and Breese quadrangles: Udden and Shaw, 1097.

Kentucky, Jefferson County: Butts, 182.

Mississippi Bluffs, Pleistocene: Berry, 99.

Massachusetts, Boston area: Shimer, 993.

Mississippi: Lowe, 709.

Montana, Phillipsburg quadrangle: Calkins and Emmons, 190.

New Jersey: Lewis and Kummel, 687.

Ohio, Columbus quadrangle: Hubbard *et al.*, 562.

Wyoming, western: Blackwelder, 108.

Paleontology.

General: Osborn, 854.

California, Mohave Desert: Merriam, 787.

Chlamytherium septentrionalis, Florida: Sel-lards, 981.

Illinois, Mollusca: Baker, 39.

Kentucky, Mississippi Bluffs, Pleistocene flora: Berry, 99.

Maryland, Indian Head, Pleistocene plants: Berry, 103.

Massachusetts, Boston area: Shimer, 993.

Michigan, Symbois cavifrons: Case, 208.

Nevada, Astor Pass, Mammalia: Merriam, 790.

Oregon, Pleistocene: McCornack, 726.

Pleistocene Mammalia: Hay, 497.

Preptoceras, Texas: Troxell, 1080.

Quebec, Montreal: Stansfield, 1931.

Quebec.**General.**

Buckingham area: Wilson, 1198.

Eastern townships: Mailhot, 749.

Harricana basin: Tanton, 1067.

Northwestern Quebec: Cooke, 269.

Economic.

General: Denis, 244.

Clay: Keele, 617.

Copper, eastern townships: Bancroft, 42.

Gold, Beauce County: Tyrrell, 1088.

Natural gas: Malcolm, 750.

Peat: Anrep, 23.

Shale: Keele, 617.

Physiographic.

General: Kindle and Burling, 647.

St. Lawrence Valley: Kindle and Burling, 647.

Table Rolante, Percé: Clarke, 233.

Quebec—Continued.**Stratigraphic.**

Beauce County: Tyrrell, 1088.

Brome and Missisquoi counties: Harvie, 493.

Gaspé region: Clarke, 232, 233.

Glacial drift, Magdalen Islands: Goldthwait, 457.

Ordovician, Lake Timiscaming: Williams, 1190.

Pleistocene, Montreal: Stansfield, 1031.

Scratched pebbles in ancient conglomerates: Clarke, 236.

Structural relations, pre-Cambrian and Paleozoic rocks: Kindle and Burling, 647.

Underground water.

Artesian wells, Montreal: Cumming, 286.

Quicksilver.

Alaska, Kuskokwim region: Smith and Mad-dren, 1014.

Arizona, Mazatzal Range: Ransome, 908.

Nevada, western: Knopf, 653.

Ontario, Cobalt: Clevenger, 238.

United States: McCaskey, 723.

Radioactivity.

General: Becker, 88.

Rainy River district, Ontario, surface geology: Johnston, 599.

Raritan flora: Berry, 104.

Red beds, western Wyoming, origin: Branson, 132.

Red Cliff region, Colorado: Means, 777.

Relief maps.

California, northern: Bryan, 156.

regon: Greg. B. M. G., 852.

Porto Rico: Berkeley, 96.

Wisconsin: Huels, 564.

Reptilia.

General: Gilmore, 446; Shimer, 992.

Allosaurus fragilis: Gilmore, 443.

Angistorhinus: Mehl, 778.

Brachiosaurus: Matthew, 770.

Corythosaurus: Matthew and Brown, 772.

Dimetrodon incisivus: Case, 207.

Dinosauria: Gilmore, 446, 447.

Alberta: Lambe, 664.

Niobrara County, Wyoming: Lull, 715.

sphenoidal sinus: Moodie, 815.

structural features: Holland, 541.

Ear structure in primitive reptiles: Case, 205.

Eocerotops: Lambe, 664.

Mycterosaurus longiceps, Mitchell Creek, Texas: Williston, 1196.

Nebraska, Cherry County, Testudo: Bar-bour, 62.

New Mexico, Triassic: Huene, 565.

Permian, Texas and New Mexico: Williston, 1194.

Phytosauria, Triassic: Mehl, 778.

Platecarpus, Wyoming: Loomis, 698.

Poposaurus gracilis, Triassic, Wyoming: Mehl, 779.

Sauropoda, Morrison formation: Lull, 713.

Stegosauria, Morrison formation: Lull, 713.

Stegosaurus, restoration: Gilmore, 442.

Reptilia—Continued.

Thescelosaurus, Lance formation, Wyoming:
Gilmore, 444.

Tomistoma, Florida: Sellards, 980.

Trachodon: Gilmore, 445.

Triassic, Connecticut Valley: Lull, 712.

New Mexico and Arizona: Mehl, 780.

Tyrannosaurus: Brown, 149.

Wyoming, Ft. Pierre shale, Platecarpus:
Loomis, 698.

Niobrara County, Lance fauna: Lull, 715.

Restorations.

Devonic fishes: Clarke, 230.

Dimetrodon incisivus: Case, 207.

Equus scottii: Troxell, 1079.

Myodon, Texas: Lull, 714.

Permo-Carboniferous: Case, 206.

Stegosaurus: Gilmore, 442.

Thescelosaurus, Lance formation, Wyoming:
Gilmore, 444.

Triassic, Connecticut Valley: Lull, 712.

Rhode Island.*Economic.*

Coal: Ashley, 29.

Stratigraphic.

Basic rocks, correlation and relationships: Haw-
kins and Brown, 495.

Petrology.

Basic rocks, correlation and relationships: Haw-
kins and Brown, 495.

Rifted relict-mountain: Clarke, 233.

Rivers.

Earth's rotation and stream erosion: Eakin,
390.

Meandering valleys: Davis, 328.

Missouri River, Tertiary history: Bauer, 84.

Underfit rivers: Davis, 328.

Yampa River, history: Hancock, 488.

Road materials.

Ontario: Reinecke, 922.

Texas: Nash, 833.

Wisconsin, limestone road materials: Hotchkiss
and Steidtmann, 553.

Rock slides. *See* Landslides.

Rocks described. *See list, p. 186.*

Roentgen ray in paleontology: Field, 412.

Rossland, British Columbia: Drysdale, 375.

Saint Vincent.*Dynamic and structural.*

Soufriere, present condition: Hovey, 557.

Salines.

Louisiana and Texas, origin: Harris, 492; Nor-
ton, 847.

Salt.*General.*

Origin: Branson, 133; Cole, 249.

Canada: Cole, 249.

Manitoba: Wallace, 1129.

United States: Phalen, 874.

Salton Sea: MacDougall, 730.

Sand. *See also* Glass sand and Silica.

Mineralogical analysis: Tomlinson, 1074.

New York, Albany molding sand: Newland,
840, 841.

Sand—Continued.

United States: Loughlin, 705.

Washington, Puget Sound: Borhek, 118.

Sandstone. *See also* Stone; Building stone.

Catahoula sandstone, Texas, origin: Goldman,
456.

San Pablo group, California: Clark, 220.

Santo Domingo.*Economic.*

General: Garrison, 435.

Copper, San Cristobal: Donnelly, 363; Garrison,
436.

Mineralogy.

General: Garrison, 435.

Sapphire.

Montana, Yogo: Freeman, 423.

Saskatchewan.*General.*

Churchill River basin: McInnes, 734.

Lake Athabasca region: Alcock, 5.

Economic.

Clay: Keele, 619.

Gold, Amisk Lake district: Bruce, 154.

Lignite, Wood Mountain area: Rose, 950.

Shale: Keele, 619.

Stratigraphic.

Amisk Lake district: Bruce, 154.

Churchill River basin: McInnes, 734.

Wood Mountain area: Rose, 950.

Sedimentation *See also* Conglomerates; Erosion.

Bacteria and deposition of calcium carbonate:
Kellerman, 621.

Black shale, formation: Schuchert, 971.

Black shale, origin: Twonhofel, 1085.

Bottom currents: Kindle, 645.

Calcium carbonate deposition and bacteria:
Kellerman, 621.

Cambrian sedimentation: Burling, 165.

Catahoula sandstone, Texas, origin: Goldman,
456.

Concretions, formation: Roddy, 941.

Connate water in oil and gas sands: Shaw, 986.

Gravel, formation and distribution: Gregory,
471.

Morrison formation: Mook, 823.

Tertiary, Cordilleran region: Matthew, 767.

Seismology. *See also* Earthquakes.

General: Palmer, 859; McAdie, 719.

Harvard seismographic station, records 1914:
Woodworth, 1207.

Weather Bureau, work of: Palmer, 859.

Serpentine.

Vermont: Wigglesworth, 1186.

Shale.

Alberta: Keele, 619; Ries, 935.

British Columbia: Ries, 935.

Manitoba: Keele, 619; Ries, 935.

Quebec: Keele, 617.

Saskatchewan: Keele, 619; Ries, 935.

Shore lines. *See also* Beaches; Terraces.

Michigan, Mackinac Island: Taylor, 1062.

Prince Edward Island, Cascumpeque Harbor:
Johnson, 587.

Strand line movements: Barrell, 71.

Slates.

United States: Katz, 612.

Silicate liquids, differentiation: Bowen, 121.

Silurian. For *Lower Silurian* see Ordovician.

Stratigraphy.

Alexandrian series: Keyes, 631.

northeastern Illinois and Wisconsin: Savage, 955.

Kentucky, Jefferson County: Butts, 182.

Manitoba: McInnes, 734.

Saskatchewan River valley: Kindle, 643.

Michigan, Houghton County, Limestone Mountain: Case and Robinson, 210.

Montana, Phillipsburg quadrangle: Calkins and Emmons, 190.

New Jersey: Lewis and Kömmel, 687.

Ohio: Bownocker, 126.

Columbus quadrangle: Hubbard *et al.*, 562.

Wooster area: Bonine, 117.

Oklahoma: Wallis, 1130.

northeastern: Snider, 1019.

Ontario: Malcolm, 750.

Eramosa beds: Williams, 1191.

Lake Timiskaming: Williams, 1190.

southwestern: Williams, 1189.

Saskatchewan: McInnes, 734.

Paleontology.

Manitoba, Saskatchewan River valley: Kindle, 643.

Michigan, Houghton County, Limestone Mountain: Case and Robinson, 210.

Ontario, Eramosa beds: Williams, 1191.

Trochoceras grovianense: Mook, 825.

Silver.**General.**

Argentiferous galena ores: Nissen and Hoyt: 842.

Borulte as silver precipitant: Palmer 860.

Colloidal silver: Bastin, 80.

Enrichment experiments: Ravicz, 910.

Alaska: Brooks, 148.

Arizona: Helkes, 503.

British Columbia, Cranbrook area: Schofield, 962.

California: Yale, 1218.

Central States: Butler and Dunlop, 177.

Colorado: Henderson, 509.

Eastern States: Dunlop, 381.

Idaho: Gerry, 439.

Montana: Helkes, 506.

Nevada: Helkes, 504.

Nevada, Eureka County, Mineral Hill district: Maynard, 775.

New Mexico: Henderson, 507.

Oregon: Yale, 1218.

South Dakota: Henderson, 508.

Texas: Henderson, 507.

Utah: Helkes, 505.

Washington: Gerry, 439.

Wyoming: Henderson, 508.

Skinography of fossils: Field, 412.

Slide rule in rock analyses: Hance, 487.

Slides. See Landslides.

Soapstone.

United States: Diller, 857.

Soils.

Florida, Bradford County: Sellards, 977.

Pinellas County: Sellards, 977.

Illinois, Lake County: Hopkins *et al.*, 548.

Indiana, Clinton County: Tharp, 1064.

Elkhart County: Jones and Hoeler, 604.

Howard County: Coryell and Rose, 371.

Jay County: Hole, 539.

Warren County: Grimes and Stevens, 480.

Kentucky: Averitt, 34.

Franklin County: Miller, 802.

Mississippi: Lowe, 700.

North Carolina, petrography of soils: Plummer, 885.

Ontario, Rainy River district: Johnston, 599.

Tennessee: Mooers, 822.

West Virginia, Boone County: Latimer, 670.

Solenopsis: Cockerell, 248.

South Carolina.**Economic.**

Barite: Watson and Grasty, 1148.

Barytes, Kings Creek: Watkins, 1144.

Dynamic and structural.

Earthquakes, 1914: Taber, 1055.

Paleontology.

Waccamaw fauna: Gardner, 482.

South Dakota.**Economic.**

Mineral production, 1914: Henderson, 508.

Dynamic and structural.

Homestake ore body: Paige, 857.

Stratigraphic.

Cannonball member of Lance formation: Lloyd and Hares, 696.

Spherulites: Wright, 1211.

Stelleroides, Paleozoic: Schuchert, 970.

Stone.

United States: Loughlin, 707.

Strand-line movements, factors in: Barrall, 71.

Stratigraphic (general). For regional see names of States. See also the different systems.

General: Anon., 1227.

Black shale problem: Grabau, 466.

Criteria for determining time relations: Matthew *et al.*, 774.

Pacific coast region: Tolman, 1070.

Unconformities in limestone: Bassler, 79.

United States, western: Campbell *et al.*, 193;

Darton *et al.*, 311; Diller *et al.*, 358; Lee *et al.*, 675.

Correlation.

General: Keyes, 640.

Alaska, southern and southwestern: Martin *et al.*, 757.

Berea grit, base: Cushing, 294.

California, southern, Tertiary correlation: Merriam, 793.

Cambrian-Beltian: Daly, 302.

Chattanooga series, Kinderhook age: Ulrich, 1098.

Cretaceous: Dowling, 367; Stanton *et al.*, 1034.

Alberta and Montana: Dowling, 368.

Wyoming and Colorado: Heroy, 513.

Cretaceous and Tertiary, Antilles: Vaughan, 1113.

Stratigraphic—Continued.**Correlation—Continued.**

- Cretaceous-Eocene contact, Atlantic and Gulf Coastal Plain: Stephenson, 1039.
 Devonian, Appalachian region: Prosser, 903.
 Fox Hills formation: Stanton, 1032.
 Gogebic iron range: Allen and Barrett, 12.
 Judith River formation: Bowen, 119.
 Jurassic and Cretaceous: Lee, 674; Osborn, 855.
 Lake Superior region, pre-Cambrian: Allen and Barrett, 12.
 Lance formation: Lloyd and Hares, 666.
 Michigan, Gogebic range: Allen and Barrett, 13.
 Mississippian: Girty, 449.
 Morrison formation, age: Berry, 102; Lull, 713; Mook, 823; Stanton, 1033.
 Ocala limestone, age: Cooke, 268.
 Oklahoma, northeastern: Snider, 1019.
 Permo-Carboniferous: Case, 206.
 Pre-Cambrian: Lane, 667.
 British Columbia: Schofield, 962.
 Lake Superior region: Leith and Allen, 680.
 Rocky Mountain region: Schofield, 962.
 Tertiary: Merriam, 788.
 Cordilleran region: Matthew, 767.
 Pacific States: Clark, 221.
 Texas: Dumble, 377.
 Wyoming, Cretaceous and Eocene: Hares, 490.

Tables of formations.

- Alberta, oil fields: Dowling, 367.
 Algonkian, Montana and Idaho: Calkins and Emmons, 190.
 Arizona, Mazatzal Range: Ransome, 906.
 British Columbia, Beaverdell area: Reinecke, 920.
 Cranbrook area: Schofield, 962.
 Golden-Kamloops: Daly, 302.
 California, San Joaquin Valley (west border): Anderson and Pack, 21.
 Colorado, Castle Rock quadrangle: Richardson, 931.
 eastern: Butler, 180.
 North Park: Beekly, 92.
 Florida: Cooke, 268; Matson, 764.
 Georgia, Coastal Plain: Stephenson and Veatch, 1041.
 Iowa: Keyes, 632.
 Kentucky, Franklin County: Miller, 802.
 Jefferson County: Butts, 182.
 Mesozoic: Clark and Twitchell, 225.
 Mexico, northeastern: Garfias, 434.
 Michigan, Gogebic range: Allen and Barrett, 13.
 New Mexico: Keyes, 642.
 Ohio, Wooster area: Bonine, 117.
 Oklahoma: Wallis, 1130.
 Ontario, Devonian: Stauffer, 1035.
 pre-Cambrian: Miller and Knight, 806.
 Ordovician, Kentucky: Miller, 804.
 Phosphate formations, Rocky Mountain region: Adams and Dick, 3.
 Pre-Cambrian: Adams, 1.
 Lake Superior region: Leith and Allen, 680.
 Ontario: Miller and Knight, 806.
 Tertiary: Merriam, 788.
 Texas, northeastern: Burchard, 158.
 Wyoming, Bighorn County: Hintze, 530.

Stream piracy.

- Utah, Provo and Weber rivers: Anderson, 20.

Strontium.

General: Hill, 523.

Study and teaching. *See* Educational.

Subsidence. *See* Changes of level.

Subterranean water. *See* Underground water.

Sulphur in rocks and in river waters: Shaw, 990.

Sulphur.

Occurrence: Shaw, 990.

United States: Phalen, 877.

Surveys.

- Alabama, report 1910-4: Smith, 1007.
 Canada, report of Survey, 1914: McConnell, 725.
 Connecticut, report, 1913-4: Conn. G. S., 259.
 Missouri, report State geologist: Buehler, 157.
 Mississippi, fifth biennial report: Lowe, 708.
 Nebraska, geological survey: Barbour, 46.
 New York: Clarke, 230.
 North Carolina, State geologist, report, 1913-4: Pratt, 896.
 Oregon: Williams, 1188.
 report: Oregon B. M. G., 851.
 United States, Report of Director, 1915: Smith, 1009.
 Wisconsin: Birge, 107.
 Wyoming, report 1913-4: Trumbull, 1081.
 Tables of geologic formations. *See under* Stratigraphic.

Tale.

United States: Diller, 357.

Technique.

- Amphibia, methods of study: Moodie, 821.
 Goniometer, crystal-grinding: Wright, 1212.
 Measurement of strata: Hewett, 515.
 Microspectroscope in mineralogy: Wherry, 1177.
 Mineralogical analysis of sand: Tomlinson, 1074.
 Polarizer in petrographic microscope: Wright, 1214.
 Skiagraphy of fossils: Field, 412.
 Slide rule in rock analyses: Hance, 487.

Tennessee.**Economic.**

- Barite: Watson and Grasty, 1148.
 Iron, Lewis County: Rogers, 946.
 Petroleum, Onelda, Scott County: Glenn, 455.
 Phosphate, Johnson County: Watkins, 1145.
 white: Hook, 547.
 Soils: Mooers, 822.
 Zinc, eastern Tennessee: Nason, 834.
 Union County: Nason, 835.

Dynamic and structural.

- Natural bridges, Cumberland Mountains: Nelson, 837.

Physiographic.

General: Glenn, 454.

Stratigraphic.

Borings, Onelda, Scott County: Glenn, 455.

Tertiary.**Stratigraphy.**

- General: Matthew, 767.
 Alaska, Broad Pass region: Moffit and Pogue, 812.
 Cantwell formation: Pogue, 886.
 Kenai Peninsula: Martin *et al.*, 757.
 Willow Creek district: Capps, 197.
 Antilles: Vaughan, 1113.
 Arizona, Santa Rita and Patagonia Mountains: Schröder, 964.

Tertiary—Continued.

Stratigraphy—Continued.

- British Columbia: Dowling, 365.
 Beavertell area: Reinecke, 920.
 Franklin mining camp, West Kootenay:
 Drysedale, 374.
 Golden-Kamloops: Daly, 302.
 Rossland: Drysdale, 375.
 southwestern: Tyrrell, 1092.
 California, Contra Costa hills, Oligocene: Clark,
 221.
 Humboldt Co.: Stalder, 1030.
 Humboldt Co.: Eel River valley: Harmon,
 491.
 Mohave Desert: Merriam, 787.
 North Coalinga region: Merriam, 788.
 San Joaquin Valley (west border): Anderson
 and Pack, 21.
 southern, Tertiary correlation: Merriam, 793.
 Tejon group: Dickerson, 348.
 Colorado, Castle Rock quadrangle: Richardson,
 931.
 North Park: Beekly, 92.
 Cretaceous-Eocene, Rocky Mountain front and
 Great Plain provinces: Ashley, 30.
 Cretaceous-Eocene contact, Atlantic and Gulf
 Coastal Plain: Stephenson, 1039.
 Cordilleras: Lindgren, 699; Matthew, 767; Ran-
 some, 907.
 Erosion intervals in Eocene of Mississippi em-
 bayment: Berry, 98.
 Florida: Dall, 301.
 Ocala limestone: Cooke, 268.
 phosphate districts: Matson, 764.
 southern: Sellards, 978.
 Georgia, Coastal Plain: Stephenson and Veatch,
 1041.
 Ione formation, Sierra Nevada foothills: Dick-
 erson, 349.
 Iowa, Fort Dodge: Keyes, 635.
 Kentucky, Franklin County: Miller, 802.
 Mexico, coastal area: Dumble, 380.
 eastern: DeGolyer, 342; Dumble, 379.
 Furber field: DeGolyer, 341.
 northeastern: Dumble, 378; Garlas, 434.
 Plateau region: Wittich, 1203.
 Mississippi: Lowe, 709.
 Montana, Boulder batholith: Billingsley, 105.
 central: Bowen, 119.
 Phillipsburg quadrangle: Calkins and Em-
 mons, 190.
 Nevada, National district: Lindgren, 690.
 Nebraska, Sioux County: Cook, 267.
 Sioux County, Pliocene: Sinclair, 1000.
 New Jersey: Lewis and Kimmel, 687.
 New Mexico, Tularosa Basin: Meinzer and
 Hare, 784.
 North Dakota, western: Lloyd and Hares, 696.
 Oahu: Hitchcock, 531.

Tertiary—Continued.

Stratigraphy—Continued.

- Utah, Coalville field: Wegemann, 1155.
 Washington, Cowlitz Valley, Eocene: Weaver,
 1152.
 Kittitas County: Saunders, 954.
 Skykomish basin: Smith, 1018.
 Tejon group: Dickerson, 348.
 Wyoming, central: Hares, 490.
 western: Blackwelder, 108.
 Yukon, upper White River district: Cairnes,
 187.
Paleontology.
 General: Matthew, 767.
 Arctic regions, Ellesmere Land, plants:
 Nathorst, 836.
 California, Mohave Desert: Merriam, 787.
 North Coalinga region: Merriam, 788.
 San Pablo group, echinoids: Kew, 629.
 Duplin fauna: Gardner, 432.
 Echinodermata: Clark and Twitchell, 225.
 Florida, Ocala limestone: Cooke, 268.
 Tampa, Oligocene Mollusca: Dall, 301.
 Tomistoma: Sellards, 980.
 Gastropoda, West: Cockerell, 244.
 Maryland, Chesapeake Beach, Miocene: Palmer,
 862.
 Mollusca, Rocky Mountain region: Cockerell,
 247.
 Nebraska, Sioux County, Pliocene: Sinclair,
 1000.
 Snake Creek beds fauna, Pliocene: Sinclair,
 1000.
 San Pablo fauna, California: Clark, 220.
 Tejon fauna: Dickerson, 348.
 Waccamaw fauna: Gardner, 432.
 Wasatch and Wind River faunas: Matthew and
 Granger, 773.
 Yorktown fauna: Gardner, 432.
 Wyoming, Union: Cockerell, 245.

Texas.

Economic.

- Copper, Red Beds: Richard, 928.
 Iron, northeastern Texas: Burchard, 158.
 Mineral production, 1914: Henderson, 507.
 Mineral Resources: Phillips, 879.
 Natural gas, Palo Pinto County: Wegemann,
 1159.
 Palo Pinto County: Pepperberg, 872.
 Petroleum: Dumble, 379; Gardner, 431.
 Thrall field: Udden, 1096.
 Potash: Phillips, 881.
 in Permian: Udden, 1094.
 Road materials: Nash, 833.
 Salines, origin: Harris, 492; Norton, 847.
Dynamic and structural.
 Catahoula sandstone, origin: Goldman, 456.
Physiographic.
 Llano Estacado, northern: Baker, 38.

Texas—Continued.**Stratigraphic—Continued.**

Palo Pinto County: Pepperberg, 872; Wegemann, 1150.

Permian-Carboniferous: Richard, 928.

Permian-Carboniferous red beds: Case, 206.

Quanah, Hardeman County: Wegemann, 1160.

Tertiary sands: Dumble, 377.

Paleontology.

Cricetus, distribution: Case, 209.

Dimetrodon incisivus, Archer County: Case, 207.

Mycterosaurus longiceps, Mitchell Creek, Texas: Williston, 1196.

Mylodon, Briscoe County: Lull, 714.

Permian Reptilia: Williston, 1194.

Preptoceras, Rock Creek: Troxell, 1080.

Trimerorhachis: Williston, 1195.

Vertebrates, Rock Creek: Troxell, 1079.

Petrology.

Catahoula sandstone, origin: Goldman, 456.

Underground water.

Llano Estacado, northern: Baker, 38.

Textbooks.

Geology: Pirsson and Schuchert, 884.

Geology and mineralogy: Hamman, 486.

Manual of petrographic methods: Johannsen, 584.

Metamorphic geology: Leith and Mead, 681.

Minerals and rocks: Bayley, 85.

Rocks and minerals: Cobb, 239.

Theeelosaurus, Lance formation, Wyoming: Gilmore, 444.

Tillite, New Hampshire: Sayles, 956.

Tin.

Alaska: Eakin, 383.

Tintic district, Utah: Lindgren, 692.

Trachodon: Gilmore, 445.

Triassic.**Stratigraphy.**

Alaska, Gravina Island: Smith, 1012.

Alaska, Kenai Peninsula: Martin *et al.*, 757.

British Columbia, Golden-Kamloops: Daly, 302.

Colorado, North Park: Beekly, 92.

Connecticut Valley: Lull, 712.

Cordilleras: Lindgren, 689.

New Brunswick: Powers, 894.

New Jersey: Lewis and Kummel, 687.

Nova Scotia: Powers, 894.

Texas, Llano Estacado, northern: Baker, 38.

Paleontology.

Connecticut Valley: Lull, 712.

Echinodermata: Clark and Twitchell, 225.

Invertebrate faunas, relations: Smith *et al.*, 1010.

Phytosauria: Mehl, 778.

Poposaurus gracilis, Wyoming: Mehl, 779.

Reptilia, New Mexico: Huene, 565.

Trimerorhachis: Williston, 1195.

Trinidad.**Economic.**

Petroleum: Cadman, 185.

Tuffs, volcanic: Pirsson, 883.

Tularosa Basin, New Mexico: Meinzer and Hare, 784.

Turquoise: Pogue, 887.

Turtles. *See* Reptilia.

Unconformities.

Berea grit, base: Cushing, 294.

Berea-Redford, Ohio: Cushing, 294.

Cretaceous-Eocene contact, Atlantic and Gulf Coastal Plain: Stephenson, 1039.

Cretaceous-Tertiary, northeastern Mexico: Dumble, 378.

Erosion intervals in Eocene of Mississippi embayment: Berry, 98.

Ohio, Mississippian-Pennsylvanian: Schroyer, 967.

Unconformities in limestone: Bassler, 79.

Underground water (general). *See also* Geysers; Mineral waters; Springs; Thermal waters. *For regional see names of States.*

General: Horton, 552.

Chlorides in oil field waters: Washburne, 1137.

Connate water in oil and gas sands: Johnson, 590; Shaw, 986.

Ungulata. *See* Mammalia.

Upper Silurian. *See* Silurian.

Utah.**Economic.**

Alunite, Marysvale and Beaver: Loughlin, 701.

Coal, Coalville field: Wegemann, 1155.

Emery Co.: Forrester, 420.

Copper, Bingham Canyon: Beeson, 93.

Cottonwood-American Fork region: Butler and Loughlin, 178.

Mineral production, 1914: Helkes, 505.

Ore deposits and intrusive bodies: Butler, 175.

Tintic district: Crane, 272, 273; Lindgren, 692.

Dynamic and structural.

Glacial deposits, so-called, Navajo Reservation: Gregory, 472.

Ore deposits and intrusive bodies: Butler, 175.

Physiographic.

Stream piracy, Provo and Weber rivers: Anderson, 20.

Stratigraphic.

Coalville field: Wegemann, 1155.

Cottonwood-American Fork region: Butler and Loughlin, 178.

Glacial deposits, so-called, Navajo Reservation: Gregory, 472.

Tintic district: Crane, 272, 273; Loughlin, 703.

Mineralogy.

Bournonite, Park City: Van Horn and Hunt, 1105.

Connellite, Tintic district: Ford and Bradley, 419.

Valleys.

Meandering valleys: Davis, 828.

U-shaped mountain valleys: Coleman, 251.

U-shaped valleys: Lane, 668.

Vanadium.

Association with petroleum and asphalt: Bird and Calcott, 106.

Vermont.**Economic.**

Dolomite, eastern Vermont: Dale, 299.

Marble, calcite, eastern Vermont: Dale, 299.

Petrology.

Serpentine: Wigglesworth, 1186.

Vertebrata (general). See also Amphibia, Aves, Mammalia, Pisces, and Reptilia.

General: Lull, 716.

Anatomy, temporal fosse: Gregory and Adams, 478.

California, Mohave Desert: Merriam, 787.

Canada: Lambe, 665.

Cretaceous: Bowen, 119.

Maryland, Chesapeake Beach, Miocene: Palmer, 862.

Nebraska: Barbour, 60.

Nebraska, Sioux County: Cook, 267.

Snake Creek beds fauna, Pliocene: Sinclair, 1000.

Permo-Carboniferous: Case, 206.

Snake Creek beds, Nebraska: Sinclair, 1000.

Wasatch and Wind River faunas: Matthew and Granger, 773.

Virginia.

Economic.

Barite: Watson and Grasty, 1148.

Iron, Oriskany ores: Weld, 1163.

Stratigraphic.

Blue Ridge: Watson and Cline, 1146.

Ordovician section, Roanoke County: Powell, 899.

Mount Vernon: Darton, 310.

Paleontology.

Eurypterid, Lyons Gap: Shuler, 998.

Yorktown fauna: Gardner, 432.

Petrology.

Basalt, Blue Ridge: Watson and Cline, 1146.

Hypersthene syenite, Blue Ridge: Watson and Cline, 1147.

Mineralogy.

Tourmaline, radiated, Nelson County: Martin, 756.

Volcanic ash.

Yukon basin: Capps, 196.

Volcanic rocks. See Igneous and volcanic rocks.

Volcanic tuffs: Pirsson, 883.

Volcanism.

General: Jaggar, 582.

Volcanic activity, origin: Moore, 826.

Volcanoes.

General.

Age as the determinant of character: Curtis, 289.

Volcanic dust valls: Arctowski, 26.

Alaska, St. Elias Mountains: Capps, 196.

Antilles, Lesser: Hovey, 657.

California, Lassen Peak, eruptions: Boerker, 116; Diller, 351; Holway, 545; Holway and Diller, 546.

Hawaii: Moore, 826; Jaggar, 581.

Kilauea: Day, 336; Jaggar, 580; Powers, 892, 893.

Mt. Loa: Jaggar, 579; Powers, 892.

eruption: Friedlaender, 424; Jaggar, 578.

Marion Colima, eruptions: W. J. ...

Washington.

Economic.

Coal, Kittitas County: Saunders, 954.

Pierce County field: Daniels, 305.

Gravel, Puget Sound: Borhek, 118.

Mineral production, 1914: Gerry, 439.

Oil and gas possibilities: Weaver, 1149.

Sand, Puget Sound: Borhek, 118.

Skykomish basin: Smith, 1018.

Physiographic.

General: Weaver, 1149.

Puget Sound, exhumed seacoasts: Keyes, 638.

Western Washington: Weaver, 1151.

Stratigraphic.

General: Weaver, 1149.

Eocene, Cowlitz Valley: Weaver, 1152.

Kittitas County: Saunders, 954; Weaver, 1154.

Olympic Peninsula: Reagan, 915.

Pleistocene, western Washington: Bretz, 135.

Seattle region: Weaver, 1150.

Skykomish basin: Smith, 1018.

Tejon group: Dickerson, 348.

Western Washington: Weaver, 1153.

Paleontology.

Tejon fauna: Dickerson, 348.

Petrology.

Skykomish basin: Smith, 1018.

Water, underground. See Underground water.

Weathering.

General: Leith and Mead, 681.

Marbles and limestones: Merrill, 796.

Stability of minerals: Fry, 426.

Volcanic tuffs: Pirsson, 883.

Well records. See Borings.

West Indies (general). See also names of islands.

Stratigraphic.

General: Vaughan, 1111.

West Virginia.

Economic.

Boone County: Krebs and Teets, 659.

Coal: Burrows, 168.

Boone County: Krebs and Teets, 659.

Logan County: Hennen and Reger, 511.

Mingo County: Hennen and Reger, 511.

Wyoming and McDowell counties: Hennen and Gawthrop, 510.

Logan County: Hennen and Reger, 511.

Mingo County: Hennen and Reger, 511.

Natural gas, Logan County: Hennen and Reger, 511.

Mingo County: Hennen and Reger, 511.

Petroleum, Boone County: Krebs and Teets, 659.

Logan County: Hennen and Reger, 511.

Mingo County: Hennen and Reger, 511.

Soils, Boone County: Latimer, 670.

Wyoming and McDowell counties: Hennen and Gawthrop, 510.

Dynamic and structural.

Chestnut Ridge disturbance: Gardner, 430.

Physiographic.

West Virginia—Continued.*Stratigraphic.*

- Boone County: Krebs and Teets, 659.
 Devonian, Romney region: Prosser, 903.
 Logan County: Hennen and Reger, 511.
 Mingo County: Hennen and Reger, 511.
 Wyoming and McDowell counties: Hennen and
 Gawthrop, 510.

Paleontology.

- Boone County: Price, 902.
 Logan County: Price, 901.
 Mingo County: Price, 901.

Wewoka fauna: Girty, 448.

Willow Creek district, Alaska: Cappe, 197.

Wind gaps: Miller, 808.

Wind work.

- General: Tolman *et al.*, 1073.
 Arid erosion, measure of: Keyes, 641.
 Corrosive efficiency of natural sand blast:
 Keyes, 636.
 Locust and character: Hobbs, 533.

Wisconsin.*General.*

- Report of Survey: Birge, 107.

Economic.

- Lead: Wright, 1210.
 Limestone road materials: Hotchkiss and
 Steidtmann, 553.
 Peat: Huels, 564.
 Zinc: George, 438; Wright, 1210.

Physiographic.

- Fox-Winnebago Valley: Whitbeck, 1179.

Stratigraphic.

- Alexandrian, eastern Wisconsin: Savage, 955.
 Pre-Cambrian, northern Wisconsin: Allen and
 Barrett, 12.

Wyoming.*General.*

- Report, 1913-14: Trumbull, 1061.

Economic.

- Gypsum: Branson, 132, 133.
 Mineral production, 1914: Henderson, 508.
 Petroleum, Basin and Greybull field: Hintze,
 530.

Physiographic.

- Western Wyoming, geologic history: Black-
 welder, 108.

Stratigraphic.

- Bighorn County: Hintze, 530.
 Cretaceous, southern Wyoming: Heroy, 513.
 Cretaceous and Eocene formations, correlations:
 Hares, 490.
 Fox Hills formations: Stanton, 1032.
 Lance formation, Niobrara County: Lull, 715.

Wyoming—Continued.*Stratigraphic—Continued.*

- Red beds, western Wyoming, origin: Branson,
 132.

Western Wyoming, geologic history: Black-
 welder, 108.

Paleontology.

- Algal reef, Teton Mountains: Blackwelder, 109.
 Gallinuloides wyomingensis: Schufeldt, 990.
 Gastropoda, Tertiary: Cockerell, 244.
 Lance fauna, Niobrara County: Lull, 715.
 Moccasin, Fort Pierre shale: Loomis, 698.
 Poposaurus gracilis, Triassic: Mehl, 779.
 Thecoscelosaurus, Lance formation: Gilmore, 444.
 Union, Tertiary: Cockerell, 245.
 Wasatch and Wind River faunas: Matthew and
 Granger, 773.

Yampa River, history: Hancock, 488.

Yellowstone National Park.

- General: Campbell *et al.*, 198; Lee *et al.*, 675.

Yukon.*Economic.*

- Gold, southwestern Yukon: Cairnes, 188.
 upper White River district: Cairnes, 187.
 Southwestern Yukon: Cairnes, 188.
 Upper White River district: Cairnes, 187.

Stratigraphic.

- Upper White River district: Cairnes, 187.
 Volcanic ash layer, Yukon basin: Cappe, 196.

Mineralogy.

- Meteorites, Gay Gulch: Johnston, 508.
 Skookum: Johnston, 508.

Zinc.*General.*

- Oxidized ores, formation from sulphide:
 Wang, 1131.
 Arizona: Helkes, 508.
 California: Yale, 1218.
 Central States: Butler and Dunlop, 177.
 Colorado: Henderson, 509.
 Eastern States: Dunlop, 381.
 Idaho: Gerry, 439.
 Missouri, Joplin district: Siebenthal, 909.
 Montana: Helkes, 506.
 Nevada: Helkes, 504.
 New Mexico: Henderson, 507.
 Oregon: Yale, 1218.
 Tennessee, eastern: Nason, 834.
 Union County: Nason, 835.
 Texas: Henderson, 507.
 Utah: Helkes, 505.
 Washington: Gerry, 439.
 Wisconsin: George, 438; Wright, 1210.

LISTS.

[The numbers refer to entries in the bibliography.]

CHEMICAL ANALYSES.

- | | |
|---|--|
| <p> Albite, 18, 668.
 Akanite, 875.
 Amphibolite, 421.
 Andesine, 68.
 Andesite, 1029.
 Andradite, 68.
 Anorthosite, 68.
 Aplite, 429.
 Augite latite, 375.
 Augite porphyryite, 375.
 Augite syenite, 374.
 Barite, 1148.
 Basalt, 374.
 Biotite, 68.
 Biotite granite, 190.
 Blomthite plumbojarosite, 651.
 Bournonite, 1105.
 Brachiopod shells, 228.
 Calcite syenite porphyry, 1209.
 Cancrinite, 68.
 Chromic iron ore, 355.
 Clay, 321, 511, 617.
 Coal, 29, 276, 365, 510, 511, 536, 538, 659, 1013, 1015, 1097, 1155.
 Congressite, 68.
 Corundum, 68.
 Corundum pegmatite, 68.
 Craigmontite, 68.
 Dahlite, 115.
 Diopside orthoclasite, 1209.
 Diorite, 622, 1209.
 Diorite porphyryite, 375.
 Dungannonite, 68.
 Echinodermata, 227.
 Empressite, 127.
 Essexite, 421.
 Feldspar, 18, 68, 429.
 Gabbro, 754, 962, 964.
 Garnet, 68, 143, 418, 623, 964, 1209.
 Gneiss, 421.
 Granite, 143, 375, 891, 931, 962, 1061.
 Granite porphyry, 375.
 Granodiorite, 143, 178, 190, 375.
 Graphite, 29.
 Hastingsite, 68.
 Hornblende, 68.
 Hypersthene gabbro, 962.
 Iron ore, 158, 499, 622, 682, 695, 1001.
 Iron-stone, 1119.
 Kaolin, 429, 1142.
 Kadebeckase, 252.
 Labradorite, 18. </p> | <p> Laterite, 622.
 Lava, 962.
 Lawsonite, 943.
 Leifite, 114.
 Limestone, 126, 159, 562, 1209.
 Loess, 108, 302.
 Manganese nodules, 296.
 Marble, 299.
 Meteorites, 404, 598, 795.
 Mica schist, 12.
 Microcline perthite, 18.
 Microperthite, 68.
 Minette, 374.
 Monmouthite, 68, 421.
 Monzonite, 374, 375, 1209.
 Mud, 518, 1041.
 Nepheline, 68.
 Nepheline basalt, 754.
 Nepheline syenite, 68, 421.
 Nitrate, 752.
 Northfieldite, 399.
 Oligoclase, 18, 68.
 Oolite, 1175.
 Pargasite, 68.
 Peat, 564.
 Pegmatite, 429.
 Peridotite, 622, 754.
 Petroleum, 568.
 Phosphate, 764.
 Phosphate rock, 3.
 Plumasite, 68.
 Plumbojarosite, 655.
 Pulaskite, 375.
 Pyroxene aplite, 190.
 Quartz diorite, 962.
 Quartz monzonite, 964.
 Quartzite, 302.
 Raglanite, 68.
 Rhyolite, 1029.
 Rubellite, 1202.
 Sand, 784.
 Serpentine, 622, 1186.
 Serpentine rock, 682.
 Shonkinite-pyroxenite, 374.
 Sodalite, 68.
 Sudburite, 252.
 Syenite, 68.
 Trachyte, 1029.
 Umpite, 68.
 Urtite, 68.
 Vegasite, 655.
 Water, 286, 518, 875, 977, 1041, 1097. </p> |
|---|--|

MINERALS DESCRIBED.¹

Albite, 658.
 Anhydrite, 944.
 Biotite, 68.
 Bisbeeite, 957.
 Bornite, 1177.
 Bournonite, 1105.
 Calcite, 68, 1184.
 Cancrinite, 68.
 Connellite, 419.
 Corundum, 68.
 Dahllite, 115.
 Datolite, 260.
 Empressite, 127.
 Feldspar, 68.
 Fernandinite, 957.
 Footelite, 419.

Garnet, 68.
 Hastingsite, 68.
 Hornblende, 68.
 Lawsonite, 943.
 Leifite, 114.
 Microcline, 166.
 Minasragrite, 957.
 Nepheline, 68.
 Plumbojarosite, 655.
 Scapolite, 68.
 Sericite, 945.
 Shattuckite, 957.
 Sodalite, 68.
 Turquoise, 887.
 Vegasite, 655.
 Zircon, 68.

ROCKS DESCRIBED.

Acidic tuff, 374.
 Amiatose, 1147.
 Andesite, 729, 812, 964.
 Anorthosite, 68.
 Aplite, 190, 964.
 Arkose, 1018.
 Arkosic grit, 374.
 Augite latite, 375.
 Augite microdiorite, 374.
 Augite porphyry, 375.
 Augite syenite, 374.
 Basalt, 374, 729.
 Biotite granite, 190.
 Canadite, 421.
 Cardifosse, 399.
 Congressite, 68.
 Corundum pegmatite, 68.
 Craigmontite, 68.
 Dacose, 1147.
 Diabase, 12, 190, 964, 1209.
 Diorite, 190, 429, 729, 1209.
 Diorite porphyry, 375.
 Essexose, 421.
 Gabbro, 962, 964, 1209.
 Granite, 12, 190, 374, 375, 429, 891, 962, 964, 1018, 1021, 1061, 1209.
 Granite porphyry, 375, 812, 964.
 Granodiorite, 143, 190, 374, 375, 729, 1018, 1209.
 Granodiorite porphyry, 374.
 Lamprophyre, 1209.
 Marble, 374.

Melanite syenite, 374.
 Metabreccia, 729.
 Micromonzonite, 374.
 Minette, 374.
 Monmouthite, 68, 421.
 Monzonite, 374, 375.
 Nepheline basalt, 754.
 Nepheline syenite, 68, 421.
 Northfieldite, 399.
 Olivine gabbro, 812.
 Pegmatite, 399, 429.
 Pegmatitic schist, 399.
 Phonolitic trachyte, 374.
 Porphyry, 1209.
 Pulaskite, 375.
 Pulaskite porphyry, 374.
 Pyroxene aplite, 190.
 Quartz diorite, 964.
 Quartz monzonite, 964, 1021.
 Quartz porphyry, 374, 1021.
 Rhyolite, 374, 729, 812, 964.
 Rhyolite porphyry, 374.
 Rosswellose, 754.
 Shonkinit-pyroxenite, 374.
 Sudburite, 252.
 Syenite, 68, 374, 1147, 1209.
 Syenite aplite, 374.
 Syenite porphyry, 374.
 Trachyte, 374, 812.
 Umptekite, 68.
 Volcanic breccia, 1021.

GEOLOGIC FORMATIONS DESCRIBED.

Aberdeen sandstone, Pennsylvanian, Kentucky: Crider, 277.
 Ackerman clays, Tertiary, Mississippi: Lowe, 709.
 Ackerman formation, Tertiary, Mississippi: Berry, 98.

Adams Lake formation, pre-Cambrian, British Columbia: Daly, 302.
 Admiralty, Pleistocene, Washington: Bretz, 135.
 Admire formation(?), Pennsylvanian, Nebraska: Condra and Bengtson, 258.

¹ The minerals described in Mitchell, No. 810, have not been included in this list.

- Aftonian interglacial stage, Pleistocene: Leverett and Taylor, 686.
- Alachua clay, Pliocene, Florida: Matson, 764.
- Alachua formation, Pliocene?, Florida: Sellards, 978.
- Alazan shales, Eocene, Mexico: Garfias, 434.
- Alazan shales, Mexico: Dumble, 379.
- Albert Canyon division, pre-Cambrian, British Columbia: Daly, 302.
- Aldridge formation, pre-Cambrian, British Columbia: Schofield, 962.
- Alexandria syenite, pre-Cambrian, New York: Cushing, 293.
- Alexandrian series, Silurian, Missouri: Keyes, 631.
- Allegheny formation, Carboniferous, Pennsylvania: Pa. Top. G. S., 870.
- Allegheny series, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Allensville member, Mississippian, Ohio: Hyde, 573.
- Allison formation, Cretaceous, Alberta: McLearn, 743.
- Alpena limestone, Devonian, Ontario: Stauffer, 1035.
- Altamont limestone, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Alum Bluff, Oligocene, Georgia: Stephenson and Veatch, 1041.
- Alum Bluff beds, Tertiary, Florida: Dall, 301.
- Alum Bluff formation, Oligocene, Florida: Matson, 764; Sellards, 978.
- Amazonia limestone, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Anawalt sandstone, Mississippian, West Virginia: Hennen and Gawthrop, 510.
- Andrew (Lawrence) shales, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Anniklean, pre-Cambrian, Ontario: Miller and Knight, 306.
- Anniklie, pre-Cambrian, Canada: Coleman, 252.
- Anniklie group, pre-Cambrian, Michigan: Allen and Barrett, 13.
- Annapolis formation, Triassic, New Brunswick and Nova Scotia: Powers, 804.
- Antrim shale, Devonian, Ontario: Stauffer, 1035.
- Anvil rock sandstone, Pennsylvanian, Kentucky: Crider, 277.
- Apache group, Cambrian, Arizona: Ransome, 908, 909.
- Apalachicola group, Oligocene, Florida: Matson, 764.
- Apalachicola group, Oligocene, Georgia: Stephenson and Veatch, 1041.
- Apishapa formation, Cretaceous, Colorado: Butler, 180.
- Arapahoe formation, Eocene, Colorado: Butler, 180.
- Arbuckle limestone, Oklahoma: Shannon and Trout, 983.
- Arecibo formation, Tertiary, Porto Rico: Berkey, 96.
- Arikaree formation, Miocene, Colorado: Butler, 180.
- Arnheim formation, Ordovician, Kentucky: Butts, 182.
- Ashland limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Aspen formation, Cretaceous, Wyoming: Huntley, 568.
- Aspinwall limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Athabaska sandstone, Keweenaw(?) Saskatchewan: McInnes, 734.
- Athabaska sandstone, pre-Cambrian, Alberta and Saskatchewan: Alcock, 5.
- Athabaska sandstone(?), pre-Cambrian, Alberta and Northwest Territory: Camell, 194.
- Athabasca sandstones, pre-Cambrian, Canada: Coleman, 252.
- Atoka formation, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Avant limestone member, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Badito formation, Carboniferous, Colorado: Butler, 180.
- Bad River formation, pre-Cambrian, Michigan: Allen and Barrett, 13.
- Bad River limestone, Algonkian, Michigan: Allen and Barrett, 12.
- Bald Knob shale, Pennsylvanian, West Virginia: Krebs and Teets, 659.
- Ballard Harmon sandstone, Mississippian, West Virginia: Hennen and Gawthrop, 510.
- Bandera shales, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Barnes conglomerate, Cambrian, Arizona: Ransome, 908, 909.
- Barnwell sand, Eocene, Georgia: Stephenson and Veatch, 1041.
- Barré limestone, Devonian, Quebec: Clarke, 232.
- Barstow formation, Miocene, California: Merriam, 787.
- Bashi formation, Tertiary: Berry, 98.
- Basin shale, Cretaceous, Wyoming: Hintze, 530.
- Bas Obispo formation, Eocene(?), Panama Canal Zone: MacDonald, 729.
- Bastion formation, pre-Cambrian, British Columbia: Daly, 302.
- Batesville sandstone, Mississippian, Arkansas: Girty, 449, 450.
- Bays standstone, Ordovician, Virginia: Shuler, 998.
- Beacon Hill gravel, Tertiary, New Jersey: Lewis and Kimmel, 687.
- Bear River series, Miocene, California: Stalker, 1030.
- Bearpaw formation, Cretaceous, Montana: Bowen, 120.
- Bearpaw shale, Cretaceous, Alberta: Dowling, 367.
- Bearpaw shale, Cretaceous, Montana: Bowen, 119.
- Bearpaw shales, Cretaceous, Alberta: Dowling, 371.
- Bearpaw shales, Cretaceous, Montana: Sternberg, 1042.
- Beaver group, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Krebs and Teets, 659.
- Beaverdell quartz monzonite, Eocene(?), British Columbia: Reinecke, 841.
- Becraft limestone, Devonian, New Jersey: Lewis and Kimmel, 687.
- Bedford formation, Mississippian, Ohio: Bownocker, 126; Hyde, 573.
- Bedford limestone, Indiana: Beede *et al.*, 91.
- Bedford limestone, Mississippian, Indiana: Malott, 751.
- Bedford shale, Devonian or Carboniferous, Ohio: Bonine, 117; Hubbard *et al.*, 562.
- Bedford shale, Ohio: Cushing, 294.

- Beechwood limestone member, Devonian, Kentucky: Butts, 182.
- Beekmantown dolomite, New York: Chadwick, 211.
- Beekmantown formation, Ordovician, Canada: Malcolm, 750.
- Bee Spring sandstone, Pennsylvanian, Kentucky: Crider, 277.
- Bellvale sandstone, Devonian, New Jersey: Lewis and Kimmel, 687.
- Belly River beds, Cretaceous, Alberta: Dowling, 370.
- Belly River series, Cretaceous, Alberta: Dowling, 371; Sternberg, 957.
- Belt series, pre-Cambrian, Montana: Calkins and Emmons, 190.
- Beltian system, pre-Cambrian, British Columbia: Daly, 302.
- Bennington limestone, Cretaceous, Oklahoma: Shannon and Trout, 983.
- Bens Creek sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511; Krebs and Teets, 659.
- Benton formation, Cretaceous, Colorado: Richardson, 931.
- Benton shale, Cretaceous, Colorado: Beekly, 92.
- Benton shales, Cretaceous, Alberta: Dowling, 374.
- Benton shales, Cretaceous, Saskatchewan: McInnes, 734.
- Benton (Lower) shale, Cretaceous, Wyoming: Hintze, 530.
- Benton (Upper) shale, Cretaceous, Wyoming: Hintze, 530.
- Berea formation, Mississippian, Ohio: Hyde, 573.
- Berea sandstone, Mississippian, Ohio: Bonine, 117; Bownocker, 126; Hubbard *et al.*, 562.
- Berea sandstone, Ohio: Cushing, 294.
- Berne member, Mississippian, Ohio: Hyde, 573.
- Bertie limestone member, Silurian, Ontario: Malcolm, 750.
- Bethany Falls limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Big Blue serpentinous member, Miocene, California: Anderson and Pack, 21.
- Bigby member, Ordovician, Kentucky: Miller, 802.
- Birch Creek schist, Paleozoic, Alaska: Martin *et al.*, 767.
- Black Hand conglomerate, Mississippian, Ohio: Bownocker, 126.
- Black Hand formation, Mississippian, Ohio: Hubbard *et al.*, 562.
- Black Hand member, Mississippian, Ohio: Hyde, 573.
- Black River group, Ordovician, Canada: Malcolm, 750.
- Black Rock cycle, Pleistocene, Wyoming: Blackwelder, 108.
- Blaine formation, Permian, Oklahoma: Shannon and Trout, 983.
- Blanco beds, Pliocene, Texas: Baker, 38.
- Blomidon shale, Triassic, New Brunswick and Nova Scotia: Powers, 894.
- Bloyd shale, Carboniferous, Arkansas: Mather, 763.
- Boggy shale, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Bohio conglomerate, Eocene(?), Panama Canal Zone: MacDonald, 729.
- Bois d'Arc limestone, Silurian, Oklahoma: Shannon and Trout, 983.
- Bokchito formation, Cretaceous, Oklahoma: Shannon and Trout, 983.
- Bolivar fire clay, Pennsylvanian, West Virginia: Hennen and Reger, 511.
- Bonaventure conglomerate, Devonian-Carboniferous, Quebec: Clarke, 232.
- Bone Valley formation, Pliocene, Florida: Sellards, 978.
- Bone Valley gravel, Pliocene, Florida: Matson, 764.
- Boone? chert, Carboniferous, Arkansas: Girty, 449.
- Boone chert member, Mississippian, Arkansas: Girty, 450.
- Boone formation, Mississippian, Oklahoma: Shannon and Trout, 983; Snider, 1019.
- Boone limestone, Mississippian, Arkansas: Girty, 450, 451.
- Bossardville limestone, Silurian, New Jersey: Lewis and Kimmel, 687.
- Bowling Green limestone, Mississippian, Kentucky: Crider, 277.
- Bowling Green limestone, Silurian, Missouri: Keyes, 631.
- Braddyville formation, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Bragdon formation, Carboniferous, California: Ferguson, 409.
- Brandywine formation, Pleistocene, Maryland: Clark, 224.
- Brannon bed, Ordovician, Kentucky: Miller, 802.
- Brassfield limestone, Silurian, Kentucky: Butts, 182.
- Brentwood limestone lentil, Carboniferous, Arkansas: Mather, 763.
- Briceville shale, Pennsylvanian, Tennessee: Glenn, 455.
- Bridgeton formation, Pleistocene, New Jersey: Lewis and Kimmel, 687.
- Brownstown sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511; Krebs and Teets, 659.
- Brownville limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Brule formation, Oligocene, Colorado: Butler, 180.
- Brunswick formation, Triassic, New Jersey: Lewis and Kimmel, 687.
- Bucks Bridge formation, New York: Chadwick, 211.
- Buena Vista sandstone, Mississippian, Ohio: Bownocker, 126.
- Buena Vista sandstone member, Mississippian, Ohio: Hyde, 573.
- Buffalo sandstone, Pennsylvanian, West Virginia: Krebs and Teets, 659.
- Buffalo stage, Pleistocene, Wyoming: Blackwelder, 108.
- Buffalo Creek limestone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Bull Lake stage, Pleistocene, Wyoming: Blackwelder, 108.
- Burgen sandstone, Ordovician, Oklahoma: Shannon and Trout, 983.
- Burgen sandstone, Ordovician, Oklahoma: Snider, 1019.
- Burlingame limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Burton formation, Cambrian, British Columbia: Schofield, 962.

- Buxton formation, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Byer member, Mississippian, Ohio: Hyde, 573.
- Byram gneiss, pre-Cambrian, New Jersey: Lewis and Kummel, 687.
- Cabot Head shale member, Silurian, Ontario: Malcolm, 750.
- Cache Creek series, Carboniferous, British Columbia: Daly, 302.
- Caddell clays, Tertiary, Texas: Dumble, 377.
- Caddo limestone, Cretaceous, Oklahoma: Shannon and Trout, 983.
- Calmito formation, Oligocene, Panama Canal Zone: MacDonald, 729.
- Calhoun shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Callaway limestone, Devonian, Missouri: Branson and Greger, 134.
- Caloosahatchee marl, Pliocene, Florida: Matson, 764.
- Calvin sandstone, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Campbell Creek limestone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Caney shale, Mississippian, Oklahoma: Shannon and Trout, 983.
- Cannelton limestone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Cannelton (Stockton) limestone, Pennsylvanian, West Virginia: Hennen and Reger, 511.
- Cannonball marine member, Tertiary (?), North and South Dakota: Lloyd and Hares, 696.
- Cantua sandstone member, Eocene, California: Anderson and Pack, 21.
- Cantwell formation, Eocene, Alaska: Moffit and Pogue, 812.
- Cantwell formation, Eocene, Alaska: Pogue, 886.
- Cape May formation, Pleistocene, New Jersey: Lewis and Kummel, 687.
- Capitan limestone, Permian, Texas: Baker, 38.
- Carbondale formation, Pennsylvanian, Illinois: Blatchley, 112; Kay and White, 616; Lee, 672; Morse and Kay, 828; Udden and Shaw, 1097.
- Cardenas formation, Cretaceous, Mexico: Garfias, 434.
- Carlile formation, Cretaceous, Colorado: Butler, 168.
- Carlville limestone member, Pennsylvanian, Illinois: Lee, 672.
- Carolina gneiss, pre-Cambrian, Georgia: Galpin, 429.
- Carrizosands, Eocene, Texas and Mexico: Dumble, 380.
- Castile formation, Permian, Texas: Baker, 38.
- Castile gypsum, Cretaceous or Jurassic, Texas: Udden, 1095.
- Castle Rock conglomerate, Oligocene, Colorado: Richardson, 931.
- Castle Rock formation, Oligocene, Colorado: Butler, 168.
- Cedar Grove (Lower) sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Cedar Grove (Middle) sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Cedar Grove (Upper) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511; Krebs and Teets, 659.
- Cedartop gypsum member, Permian, Oklahoma: Shannon and Trout, 983.
- Cedarville limestone, Silurian, Ohio: Bownocker, 126.
- Cement City limestone, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Centennial limestone, Paleozoic, Utah: Crane, 272, 273.
- Cerro till, Pleistocene, Colorado: Atwood, 33.
- Chagrin formation, Devonian, Ohio: Bonine, 117.
- Chagrin shale, Ohio: Cushing, 294.
- Chaney gypsum member, Permian, Oklahoma: Shannon and Trout, 983.
- Chanute shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Charlton formation, Pliocene(?), Georgia: Stephenson and Veatch, 1041.
- Chase formation, pre-Cambrian, British Columbia: Daly, 302.
- Chattahoochee formation, Oligocene, Florida: Matson, 764.
- Chattahoochee formation, Oligocene, Georgia: Stephenson and Veatch, 1041.
- Chattahoochee group, Tertiary, Florida: Dall, 301.
- Chattanooga black shale, Devonian, Tennessee: Glenn, 455.
- Chattanooga shale, Devonian, Oklahoma: Shannon and Trout, 983.
- Chattanooga shale, Devonian(?), Oklahoma: Snider, 1019.
- Chattanooga series, Mississippian: Ulrich, 1098.
- Chazy formation, Ordovician, Canada: Malcolm, 750.
- Chehalis formation, Eocene, Washington: Dickerson, 348.
- Chelmsford sandstone, pre-Cambrian, Canada: Coleman, 252.
- Cherokee formation, Pennsylvanian, Oklahoma: Shannon and Trout, 983; Snider, 1019.
- Cherokee shale, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Cherryvale shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Chester group, Mississippian, Illinois: Blatchley, 112; Udden and Shaw, 1097.
- Chester group, Mississippian, Indiana: Beede *et al.*, 91; Malott, 751.
- Chester group, Mississippian, Oklahoma: Snider, 1019.
- Chickaloon formation, Tertiary, Alaska: Martin

- Chief Consolidated limestone, Paleozoic, Utah: Crane, 272, 273.
- Chignik formation, Cretaceous, Alaska: Martin *et al.*, 757.
- Chilton (Lower) sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Chilton (Upper) sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Chimneyhill limestone, Silurian, Oklahoma: Shannon and Trout, 983.
- Chinitna shale, Jurassic, Alaska: Martin *et al.*, 757.
- Chipola marl, Oligocene, Florida: Matson, 764.
- Chipola marls, Tertiary, Florida: Dall, 301.
- Chisik conglomerate, Jurassic, Alaska: Martin *et al.*, 757.
- Chitstone limestone, Triassic, Alaska: Martin *et al.*, 757; Mertie, 799.
- Choctawhatchee marl, Miocene, Florida: Matson, 764.
- Chugwater formation, Permian-Triassic(?), Colorado: Butler, 180.
- Chugwater formation, Permian and Triassic, Wyoming: Branson, 132.
- Chugwater formation, Triassic(?), Colorado: Beekly, 92.
- Churn Creek member, Mississippian, Ohio: Hyde, 573.
- Circle cycle, Pleistocene, Wyoming: Blackwelder, 108.
- Cisco division, Texas: Dumble, 379.
- City Bluffs (Scranton) shales, Pennsylvanian, Nebraska: Condra and Bengtson, 238.
- Claggett formation, Cretaceous, Montana: Bowen, 119.
- Claggett shale, Cretaceous, Montana: Bowen, 120.
- Claggett shales, Cretaceous, Montana: Sternberg, 1042.
- Clalborne, Eocene, Texas and Mexico: Dumble, 380.
- Clalborne, Tertiary, Mexico: Dumble, 378.
- Clalborne group, Eocene, Georgia: Stephenson and Veatch, 1041.
- Clalborne group, Eocene, Texas: Burchard, 158.
- Clalborne group, Tertiary, Alabama: Berry, 98.
- Clalborne group, Tertiary, Mississippi: Lowe, 709.
- Clalborne (Lower) formation, Tertiary, Texas: Dumble, 377.
- Clalborne (Upper) formation, Tertiary, Texas: Dumble, 377.
- Clarendon beds, Miocene, Texas: Baker, 38.
- Clarion (Lower) sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511.
- Clayton formation, Tertiary, Mississippi: Lowe, 709.
- Clear Fork division, Permian, Texas: Richard, 928.
- Clear Fork formation, Permian, Texas: Baker, 38.
- Clear Fork formation, Permian-Carboniferous, Texas: Case, 206.
- Cleveland shale, Devonian, Ohio: Bonine, 117.
- Cleveland shale, Ohio: Cushing, 294.
- Clinton formation, Silurian, Ontario: Malcolm, 750.
- Clinton limestone, Silurian, Ohio: Bownocker, 126.
- Clinton sand, Silurian, Ohio: Bonine, 117.
- Cloverly formation, Cretaceous, Wyoming: Hintze, 539.
- Coalburg (Lower) sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Coalburg (Upper) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511.
- Coalburg sandstone, Pennsylvanian, West Virginia: Krebs and Teets, 659.
- Coalmont formation, Cretaceous or Tertiary, Colorado: Beekly, 92.
- Coamo tuff limestone, Cretaceous, Porto Rico: Berkey, 96.
- Cobalt series, pre-Cambrian, Canada: Coleman, 252.
- Cobleskill dolomite, Silurian, Ontario: Malcolm, 750.
- Cobconk limestone, Ordovician, Canada: Malcolm, 750.
- Cocksfield Ferry beds, Eocene, Texas: Dumble, 380.
- Coeymans limestone, Devonian, New Jersey: Lewis and Kummel, 687.
- Coffeyville formation, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Cohansey sand, Tertiary, New Jersey: Lewis and Kummel, 687.
- Collingwood formation, Ordovician, Canada: Malcolm, 750.
- Collingsworth gypsum member, Permian, Oklahoma: Shannon and Trout, 983.
- Colorado formation, Cretaceous, Montana: Calkins and Emmons, 190.
- Colorado group, Cretaceous, Alberta: Dowling, 367.
- Colorado group, Cretaceous, Colorado: Beekly, 92; Richardson, 931.
- Colorado group, Cretaceous, Wyoming: Hintze, 530.
- Colorado shale, Cretaceous, Montana: Bowen, 119, 120.
- Columbia group, Pleistocene, Georgia: Stephenson and Veatch, 1041.
- Columbus limestone, Devonian, Ohio: Bownocker, 126; Hubbard *et al.*, 562.
- Conemaugh formation, Carboniferous, Pennsylvania: Pa. Top. G. S., 870.
- Conemaugh series, Pennsylvanian, West Virginia: Krebs and Teets, 659.
- Congaree clay member, Eocene, Georgia: Stephenson and Veatch, 1041.
- Conover slates, Algonkian, Michigan: Allen and Barrett, 12.
- Cook Mountain formation, Eocene, Texas: Burchard, 158.
- Copley meta-andesite, Devonian or older, California: Ferguson, 409.
- Copper Cliff arkose, pre-Cambrian, Canada: Coleman, 252.
- Copps formation, Algonkian, Michigan: Allen and Barrett, 12.
- Copps group, pre-Cambrian, Michigan: Allen and Barrett, 13.
- Coquina limestone, Tertiary, Mexico: Dumble, 378.
- Cornwall (Pequanac) shale, Devonian, New Jersey: Lewis and Kummel, 687.
- Corozal limestone, Cretaceous, Porto Rico: Berkey, 96.
- Corrigan sands, Oligocene, Texas: Dumble, 377.

- Coryell batholith, Miocene, British Columbia: Drysdale, 375.
- Cottonwood limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Cottonwood limestone, Permian, Kansas: Shannon and Trout, 983.
- Cougar formation, pre-Cambrian, British Columbia: Daly, 302.
- Couchiching series, pre-Cambrian, Canada: Coleman, 252.
- Cowlitz formation, Eocene, Washington: Dickerson, 348.
- Craghead Creek shale, Devonian, Missouri: Branson and Greger, 134.
- Creston formation, pre-Cambrian, British Columbia: Schofield, 962.
- Crowsnest volcanics, Cretaceous, Alberta: McLearn, 743.
- Cuchara formation, Eocene, Colorado: Butler, 180.
- Cucuracha formation, Oligocene, Panama Canal Zone: MacDonald, 729.
- Culebra formation, Oligocene, Panama Canal Zone: MacDonald, 729.
- Cullom limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Cardsville member, Ordovician, Kentucky: Miller, 802.
- Curry Creek series, Oligocene, British Columbia: Reinecke, 920.
- Cusseta sand member, Cretaceous, Georgia: Stephenson and Veatch, 1041.
- Cuyahoga formation, Mississippian, Ohio: Bonine, 117; Bownocker, 126; Hubbard *et al.*, 562; Hyde, 573.
- Cynthiana formation, Ordovician, Kentucky: Miller, 804.
- Cynthiana member, Ordovician, Kentucky: Miller, 802.
- Cypress (Brewerville) sandstone, Mississippian, Illinois: Blatchley, 112.
- Dakota formation, Cretaceous, Alberta: McLearn, 743.
- Dakota formation, Cretaceous, Colorado: Butler, 180.
- Dakota sand, Cretaceous: Huntley, 568.
- Dakota sands, Cretaceous, Alberta: Dowling, 367.
- Dakota sandstone, Cretaceous, Colorado: Beekly, 92; Richardson, 931.
- Dakota sandstone, Cretaceous, Saskatchewan: McInnes, 734.
- Dakota series, Cretaceous, Alberta: Dowling, 371.
- Dawson arkose, Eocene, Colorado: Richardson, 931.
- Dawson formation, Eocene, Colorado: Butler, 180.
- Day Creek dolomite, Permian, Oklahoma: Shannon and Trout, 983.
- Day Creek shales, Permian, Oklahoma: Shannon and Trout, 983.
- Dayton limestone, Silurian, Ohio: Bownocker, 126.
- Deadman limestone, Triassic, Idaho: Mansfield, 752.
- Decker formation, Silurian, New Jersey: Lewis and Kimmel, 687.
- Decota sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511; Krebs and Teets, 659.
- Deer Creek limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Delaware formation, Devonian, Ontario: Malcolm, 750.
- Delaware limestone, Devonian, Ohio: Bownocker, 126.
- Delaware limestone, Devonian, Ontario: Stauffer, 1035.
- Delaware mountain formation, Permian, Texas: Baker, 38.
- Denver formation, Eocene, Colorado: Butler, 180.
- Des Moines group, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Detroit River series, Devonian, Ontario: Stauffer, 1035.
- Dewey limestone, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Dingess limestone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Dockum formation, Triassic, Texas: Baker, 38.
- Don beds, Pleistocene, Canada: Coleman, 255.
- Doré formation, pre-Cambrian, Canada: Coleman, 252.
- Double Mountain division, Permian, Texas: Richard, 928.
- Double Mountain formation, Permian, Texas: Baker, 38.
- Double Mountain formation, Permo-Carboniferous, Texas: Case, 206.
- Douglas formation, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Douglas shale, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Doyle shale, Permian, Oklahoma: Shannon and Trout, 983.
- Dripping Spring quartzite, Cambrian, Arizona: Ransome, 906, 909.
- Drum limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Dunkard series, Permian, Pennsylvania: Pa. Top. G. S., 797.
- Dunvegan sandstones, Cretaceous, Alberta: Dowling, 370.
- Duplin formation, Tertiary, North Carolina: Gardner, 432.
- Duplin marl, Miocene, Georgia: Stephenson and Veatch, 1041.
- Durango till, Pleistocene, Colorado: Atwood, 33.
- Eagle limestone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Krebs and Teets, 659.
- Eagle limestone and shale, Pennsylvanian, West Virginia: Hennen and Reger, 511.
- Eagle sandstone, Cretaceous, Montana: Bowen, 119; Sternberg, 1042.
- Eagle sandstone, Cretaceous, Wyoming: Hintze, 530.
- Eagle sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511; Krebs and Teets, 659.
- Eastern or Jacobsville sandstone, pre-Cambrian, Michigan: Allen and Barrett, 13.
- East Lynn sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Easton schist, pre-Tertiary, Washington: Saunders, 954.
- Easton schist, Washington: Smith, 1018.
- Eckman sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Eden member, Ordovician, Kentucky: Miller, 802.
- Eden shale, Ordovician, Ohio: Bownocker, 126.

- Edgewood formation, Silurian, Missouri: Keyes, 631.
- Edmonton formation, Cretaceous, Alberta: Dowling, 370.
- Edmonton-St. Mary series, Cretaceous, Alberta: Dowling, 371.
- El Abra limestone, Cretaceous, Mexico: Garfias, 434.
- Elgin sandstone, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Elko formation, Cambrian, British Columbia: Schofield, 962.
- Ellensburg formation, Miocene, Washington: Saunders, 954.
- Ellis formation, Jurassic, Montana: Calkins and Emmons, 190.
- Elm Point limestones, Devonian, Manitoba: Wallace, 1129.
- Emperor limestone, Oligocene, Panama Canal Zone: MacDonald, 729.
- Englishtown sand, Cretaceous, New Jersey: Lewis and Kummel, 687.
- Enid formation, Permian, Oklahoma: Shannon and Trout, 983.
- Enochkin formation, Jurassic, Alaska: Martin *et al.*, 692.
- Eramosa beds, Silurian, Ontario: Williams, 1191.
- Escondido beds, Cretaceous, Mexico: Dumble, 378.
- Eska conglomerate, Tertiary, Alaska: Martin *et al.*, 757.
- Eskridge shales, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Eskridge shales, Permian, Kansas: Shannon and Trout, 983.
- Esopus grit, Devonian, New Jersey: Lewis and Kummel, 687.
- Etchegoin formation, Miocene and Pliocene, California: Anderson and Pack, 21.
- Etheline volcanics, Tertiary, British Columbia: Mackenzie, 736.
- Euclid sandstone, Mississippian, Ohio: Bownocker, 126.
- Euclid sandstone lentil, Ohio: Cushing, 294.
- Eutaw formation, Cretaceous, Georgia: Stephenson and Veatch, 1041.
- Eutaw formation, Cretaceous, Mississippi: Lowe, 709.
- Fairfield member, Mississippian, Ohio: Hyde, 573.
- Falls City limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Fargo limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Farley limestone bed, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Farnham slates, Ordovician, Quebec: Harvie, 493.
- Faulconer bed, Ordovician, Kentucky: Miller, 802.
- Fayette, Eocene, Texas and Mexico: Dumble, 380.
- Fayette, Tertiary, Mexico: Dumble, 378.
- Fayette sand, Eocene, Texas: Dumble, 377.
- Fayetteville formation, Mississippian, Oklahoma: Snider, 1019.
- Fayetteville shale, Mississippian, Oklahoma: Shannon and Trout, 983.
- Ferguson gypsum, Permian, Oklahoma: Shannon and Trout, 983.
- Fernie shales, Cretaceous, Alberta: Dowling, 371.
- Five Island volcanics, Triassic, New Brunswick and Nova Scotia: Powers, 894.
- Flaming Gorge formation, Jurassic, Colorado: Butler, 180.
- Flanagan member, Ordovician, Kentucky: Miller, 802.
- Flathead quartzite, Cambrian, Montana: Calkins and Emmons, 190.
- Flattop Mountain sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Fleming beds, Tertiary, Texas: Dumble, 377.
- Florena shales, Permian, Kansas: Shannon and Trout, 983.
- Florence shale, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Forbes (Deer Creek) limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Fort Hall formation, Triassic, Idaho: Mansfield, 753.
- Fort Riley limestone, Permian, Oklahoma: Shannon and Trout, 983.
- Fort Scott formation, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Fort Scott limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Fort Union formation, Eocene, North and South Dakota: Lloyd and Hares, 696.
- Fort Union formation, Eocene, Saskatchewan: Rose, 950.
- Fountain formation, Pennsylvanian, Colorado: Butler, 180; Richardson, 931.
- Fox Hills formation, Cretaceous, Colorado: Butler, 180.
- Fox Hills sandstone, Cretaceous, Colorado: Richardson, 931.
- Fox Hills sandstone, Cretaceous, North and South Dakota: Lloyd and Hares, 696.
- Fox Hills sandstone, Cretaceous, Saskatchewan: Rose, 871.
- Franciscan formation, Jurassic (?), California: Anderson and Pack, 21.
- Franciscan group, Jurassic (?), California: Clark, 223.
- Franciscan series, California: Stalder, 1030.
- Franklin granodiorite, Jurassic, British Columbia: Drysdale, 374.
- Franklin group, Carboniferous, British Columbia: Drysdale, 374.
- Franklin limestone, pre-Cambrian, New Jersey: Lewis and Kummel, 687.
- Franklin monzonite, Oligocene, British Columbia: Drysdale, 374.
- Franks conglomerate, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Freeport (Lower) sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511.
- Freeport (Upper) sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Fremont cycle, Pliocene, Wyoming: Blackwelder, 108.
- Frio, Tertiary, Mexico: Dumble, 378.
- Frio clays, Eocene, Texas and Mexico: Dumble, 380.
- Frio clays, Tertiary, Texas: Dumble, 377.
- Galena-Trenton limestones, Ordovician, Saskatchewan and Manitoba: McInnes, 734.
- Galesburg shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.

- Galton series, pre-Cambrian, British Columbia: Schofield, 962.
- Garrard bed, Ordovician, Kentucky: Miller, 802.
- Garrison formation, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Garrison formation, Permian, Kansas: Shannon and Trout, 983.
- Garrison limestone, Pennsylvanian or Permian, Nebraska and Kansas: Condra and Bengtson, 258.
- Gateway formation, pre-Cambrian, British Columbia: Schofield, 962.
- Gastun formation, Oligocene, Panama Canal Zone: MacDonald, 729.
- Gemini limestone, Paleozoic, Utah: Crane, 272, 273.
- Gila conglomerate, Quaternary (?), Arizona: Ransome, 908.
- Gilbert (Lower) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511.
- Gilbert (Upper) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511.
- Gilbert shale, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Glacier division, pre-Cambrian, British Columbia: Daly, 302.
- Glenn formation, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Gloucester formation, Carboniferous, British Columbia: Drysdale, 374.
- Golden Ray limestone, Paleozoic, Utah: Crane, 272, 273.
- Goodland limestone, Cretaceous, Oklahoma: Shannon and Trout, 983.
- Gosport sand, Tertiary, Alabama: Berry, 98.
- Grand Falls chert member, Mississippian, Arkansas: Girty, 451.
- Grand Grève limestone, Devonian, Quebec: Clarke, 232.
- Grand Gulf group, Tertiary, Mississippi: Lowe, 709.
- Grand Gulf sandstones, Oligocene, Texas: Dumble, 390.
- Graneros formation, Cretaceous, Colorado: Butler, 180.
- Granville shale, Mississippian, Ohio: Hyde, 573.
- Grapevine sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511.
- Greendale bed, Ordovician, Kentucky: Miller, 802.
- Greene formation, Permian, Pennsylvania: Pa. Top. G. S., 870.
- Greenhorn formation, Cretaceous, Colorado: Butler, 180.
- Green Pond conglomerate, Silurian, New Jersey: Lewis and Kümmel, 687.
- Greer formation, Permian, Oklahoma: Shannon and Trout, 983.
- Greer formation, Permian, Texas: Baker, 38.
- Grenada beds, Tertiary, Mississippi: Lowe, 709.
- Grenada formation, Tertiary, Mississippi: Berry, 98.
- Grenville (?) series, Laurentian, Saskatchewan and Manitoba: McInnes, 734.
- Grenville series, pre-Cambrian, Canada: Coleman, 252.
- Grenville series, pre-Cambrian, New York: Cush- ing, 203.
- Greyson (?) shale, pre-Cambrian, Montana: Calkins and Emmons, 190.
- Grimsby sandstone member, Silurian, Ontario: Malcolm, 750.
- Guanica coral reefs, Tertiary, Porto Rico: Berkey, 96.
- Guelph formation, Silurian, Ontario: Malcolm, 750.
- Guelph formation, Silurian, Ontario: Williams, 1189.
- Gayandot sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Gwinn series, Algonkian, Michigan: Allen and Barrett, 12.
- Haida formation, Cretaceous, British Columbia: Mackenzie, 736.
- Hale formation, Carboniferous, Arkansas: Mather, 763.
- Hale sandstone member, Pennsylvanian, Oklahoma: Snider, 1019.
- Hamilton formation, Devonian, Ontario: Malcolm, 750; Stauffer, 1035.
- Hampshire formation, Devonian, West Virginia: Prosser, 903.
- Haragan shale, Silurian, Oklahoma: Shannon and Trout, 983.
- Hardyston quartzite, Cambrian, New Jersey: Lewis and Kümmel, 687.
- Harrodsburg limestone, Indiana: Beede *et al.*, 91.
- Harrodsburg limestone, Mississippian, Indiana: Malott, 751.
- Hartselle sandstone, Mississippian, Mississippi: Lowe, 709.
- Hartshorne sandstone, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Hartwell sandstone, Mississippian, West Virginia: Hennen and Gawthrop, 510.
- Harvey conglomerate, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Hasmark formation, Cambrian, Montana: Calkins and Emmons, 190.
- Hatchetigbee formation, Tertiary: Berry, 98.
- Hawkins formation, pre-Tertiary, Washington: Saunders, 954.
- Haystack gypsum member, Permian, Oklahoma: Shannon and Trout, 983.
- Helderberg formation, Devonian, Maryland: Prosser, 903.
- Henley shale member, Mississippian, Ohio: Hyde, 573.
- Henrietta formation, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Henryhouse shale, Silurian, Oklahoma: Shannon and Trout, 983.
- Herendeen limestone, Cretaceous, Alaska: Martin *et al.*, 757.
- Hermitage member, Ordovician, Kentucky: Miller, 802.
- Hernshaw sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Herrington limestone, Permian, Oklahoma: Shannon and Trout, 983.
- Hertha limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Heuvelton sandstone, New York: Chadwick, 211.
- Higham grit, Triassic, Idaho: Mansfield, 753.
- High Falls formation, Silurian, New Jersey: Lewis and Kümmel, 687.

- Hits limestone member, Ordovician, Kentucky: Butts, 182.
- Hocking Valley conglomerate, Mississippian, Ohio: Hyde, 573.
- Hogshooter limestone, Pennsylvanian, Oklahoma: Shannon and Trout, 963.
- Hoh formation, pre-Tertiary, Washington: Weaver, 1149.
- Holdenville shale, Pennsylvanian, Oklahoma: Shannon and Trout, 963.
- Holly Springs sand, Tertiary, Mississippi: Berry, 98.
- Holly Springs sand, Tertiary, Mississippi: Lowe, 709.
- Holtscaw sandstone, Mississippian, Kentucky: Butts, 182.
- Homewood (Roaring Creek) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511; Krebs and Teets, 659.
- Honna conglomerate and sandstone, Cretaceous, British Columbia: Mackenzie, 736.
- Hornerstown marl, Cretaceous, New Jersey: Lewis and Kummel, 687.
- Howard limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Humbug limestone, Paleozoic, Utah: Crane, 273.
- Humbug sandstone, Paleozoic, Utah: Crane, 272, 273.
- Hunton formation, Silurian, Oklahoma: Shannon and Trout, 963.
- Huron shale, Devonian, Ohio: Bonine, 117; Stauffer, 951.
- Huron shale, Devonian, Ontario: Malcolm, 750; Stauffer, 1035.
- Huronian, pre-Cambrian, Canada: Coleman, 252.
- Huronian, pre-Cambrian, Saskatchewan and Manitoba: McInnes, 734.
- Hygiene sandstone, Cretaceous, Colorado: Butler, 180.
- Jaeger (Lower) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Jaeger (Middle) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Jaeger (Upper) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Jatan limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Idaho Springs formation, pre-Cambrian, Colorado: Bastin, 81.
- Illecillewaet quartzite, pre-Cambrian, British Columbia: Daly, 302.
- Illinoian drift, Pleistocene, Ohio: Hubbard *et al.*, 562.
- Illinoian drift, Pleistocene: Leverett and Taylor, 686.
- Illinoian till, Pleistocene, Illinois: Udden and Shaw, 1097.
- Index granodiorite, Washington: Smith, 1018.
- Ingleside formation, Mississippian?—Pennsylvanian, Colorado: Butler, 180.
- Ipperwash limestone, Devonian, Ontario: Stauffer, 1035.
- Ipperwash limestone member, Devonian, Ontario: Malcolm, 750.
- Iola limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Ione formation, Tertiary, California: Dickerson, 349.
- Iowan drift, Pleistocene: Leverett and Taylor, 686.
- Iron formation, Algonkian, Michigan: Allen and Barrett, 12.
- Irondequoit limestone member, Silurian, Ontario: Malcolm, 750.
- Ironwood formation, Algonkian, Michigan: Allen and Barrett, 12.
- Ironwood formation, pre-Cambrian, Michigan: Allen and Barrett, 13.
- Jacalitos formation, Miocene, California: Anderson and Pack, 21.
- Jackford sandstone, Oklahoma: Shannon and Trout, 963.
- Jackson, Eocene, Texas: Dumble, 390.
- Jackson clays, Tertiary, Texas: Dumble, 377.
- Jackson formation, Eocene, Georgia: Stephenson and Veach, 1041.
- Jackson formation, Tertiary, Texas: Dumble, 377.
- Jackson group, Tertiary, Mississippi: Lowe, 709.
- Jacksonburg limestone, Ordovician, New Jersey: Lewis and Kummel, 687.
- Jacksonville formation, Miocene, Florida: Matson, 764.
- Jacobsville, Paleozoic, Michigan: Case and Robinson, 210.
- Jacobsville sandstone, pre-Cambrian, Michigan: Allen and Barrett, 13.
- Jefferson limestone, Devonian, British Columbia: Schofield, 962.
- Jefferson limestone, Devonian, Montana: Calkins and Emmons, 190; Haynes, 502.
- Jeffersonville limestone, Devonian, Kentucky: Butts, 182.
- Jerseyan drift, Pleistocene, New Jersey: Lewis and Kummel, 687.
- Juana Diaz marls Tertiary, Porto Rico: Berkey, 96.
- Judith River beds, Cretaceous, Montana: Sternberg, 1042.
- Judith River formation, Cretaceous, Montana: Bowen, 119, 120.
- Kamishak chert, Triassic, Alaska: Martin *et al.*, 692.
- Kamloops group, Oligocene, British Columbia: Daly, 302.
- Kanawha black flint, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511.
- Kanawha group, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Kanawha series, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Kanouse sandstone, Devonian, New Jersey: Lewis and Kummel, 687.
- Kansas drift, Pleistocene: Leverett and Taylor, 686.
- Kansas City formation, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Kanwaka shale, Pennsylvanian, Nebraska and Kansas: Condra and Bengtson, 258.
- Kanwaka shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Keechelus andesitic series, Miocene, Washington: Smith, 1018.
- Keeseville(?) (Potsdam) sandstone, New York: Chadwick, 211.
- Keewatin, pre-Cambrian, Saskatchewan and Manitoba: McInnes, 734.

- Keewatin group, pre-Cambrian, Canada: Coleman, 252.
 Kenai formation, Tertiary, Alaska: Martin *et al.*, 757.
 Kennicott formation, Jurassic, Alaska: Martin *et al.*, 757.
 Kenwood sandstone, Mississippian, Kentucky: Butts, 182.
 Keokuk limestone, Mississippian, Illinois: Morse and Kay, 828.
 Kessler limestone lentil, Carboniferous, Arkansas: Mather, 763.
 Kettle River formation, Eocene or Oligocene, British Columbia: Drysdale, 374.
 Keewenawan, pre-Cambrian, Canada: Coleman, 252.
 Keewenawan series, Algonkian, Michigan: Allen and Barrett, 12.
 Key Largo limestone, Pleistocene, Florida: Matson, 764.
 Keystone sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
 Key West oolite, Pleistocene, Florida: Matson, 764.
 Kiamichi formation, Cretaceous, Oklahoma: Shannon and Trout, 983.
 Kinderhook beds, Mississippian, Oklahoma: Snider, 1019.
 Kinderhook group, Mississippian, Illinois: Blatchley, 112.
 Kirkfield limestone group, Ordovician, Ontario, Malcolm, 750.
 Kirkwood formation, Tertiary, New Jersey: Lewis and Kimmel, 687.
 Kiser gypsum member, Permian, Oklahoma: Shannon and Trout, 983.
 Kitchener formation, pre-Cambrian, British Columbia: Schofield, 962.
 Kittatinny limestone, Cambrian and Ordovician, New Jersey: Lewis and Kimmel, 687.
 Knobstone group, Mississippian, Indiana: Malott, 751.
 Knoxville formation, Cretaceous, California: Clark, 223.
 Kootenai(?) formation, Cretaceous, Montana: Bowen, 120.
 Kootenai formation, Cretaceous, Montana: Calkins and Emmons, 190.
 Kootenay granite, Jurassic(?), British Columbia: Schofield, 962.
 Kootenay series, Cretaceous, Alberta: Dowling, 371.
 Kroyenhagen shale, Oligocene(?), California: Anderson and Pack, 21.
 Labette shale, Pennsylvanian, Missouri: Hinds and Greene, 529.
 Labette shale, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
 La Biche shales, Cretaceous, Alberta: Huntley, 568.
 Lac LaRonge series, Laurentian, Saskatchewan: McInnes, 734.
 Ladore shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.
 Lagarto sand, Pliocene, Texas: Dumble, 377.
 La Muda limestone, Cretaceous, Porto Rico: Berkeley, 96.
 Lance beds, Cretaceous or Tertiary, Wyoming, Hares, 490.
 Lance formation, Cretaceous or Tertiary, Saskatchewan: Rose, 950.
 Lance formation, Cretaceous or Tertiary, Wyoming: Lull, 715.
 Lance formation, Tertiary(?), Montana: Bowen, 119, 120.
 Lance formation, Tertiary(?), North and South Dakota: Lloyd and Hares, 696.
 Landgraff sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
 Lane shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.
 Lansing formation, Pennsylvanian, Missouri: Hinds and Greene, 529.
 Lapara sand, Pliocene, Texas: Dumble, 377.
 Laramie formation, Cretaceous, Colorado: Butler, 180; Richardson, 931.
 Las Cascadas agglomerate, Eocene(?), Panama Canal Zone: MacDonald, 729.
 Lauderdale chert, Mississippian, Mississippi: Lowe, 709.
 Laurel dolomite, Silurian, Kentucky: Butts, 182.
 Laurie formation, pre-Cambrian, British Columbia: Daly, 302.
 Lawrence shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.
 Le Compton limestone, Pennsylvanian, Nebraska and Kansas: Condra and Bengtson, 258.
 Lecompton limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
 Leda clay, Pleistocene, Canada: Stansfield, 1031.
 Lee formation, Pennsylvanian, Tennessee: Glenn, 455.
 Lenapah limestone, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
 Lenore cycle, Pleistocene, Wyoming: Blackwelder, 108.
 Leray limestone, Ordovician, Canada: Malcolm, 750.
 Lewis formation, Cretaceous, Colorado: Butler, 180.
 Lewis formation, Cretaceous, Wyoming: Hares, 490.
 Liberty formation, Ordovician, Kentucky: Butts, 182.
 Lisbon formation, Tertiary, Alabama and Mississippi: Berry, 98.
 Lithopolis member, Mississippian, Ohio: Hyde, 573.
 Lockatong formation, Triassic, New Jersey: Lewis and Kimmel, 687.
 Lockport, Silurian, Michigan: Case and Robinson, 210.
 Lockport dolomite member, Silurian, Ontario: Malcolm, 750.
 Logan formation, Mississippian, Ohio: Hyde, 573.
 Logan sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
 Loganian, pre-Cambrian, Ontario: Miller and Knight, 806.
 Longwood shale, Silurian, New Jersey: Lewis and Kimmel, 687.
 Lorraine formation, Ordovician, Canada: Malcolm, 750.

- Lorraine formation, Ordovician, Ohio: Bownocker, 126.
- Loose gneiss, pre-Cambrian, New Jersey: Lewis and Kummel, 687.
- Lostmans River limestone, Pleistocene, Florida: Matson, 764.
- Louisville limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Louisville limestone, Silurian, Kentucky: Butts, 182.
- Lowville formation, Ordovician, Canada: Malcolm, 750.
- Ludlow lignite member, Tertiary(?), North and South Dakota; Lloyd and Hares, 696.
- Lykins formation, Permian(?), Colorado: Richardson, 931.
- Lykins formation, Permian-Triassic(?), Colorado: Butler, 180.
- Lyons formation, Permian-Triassic(?), Colorado: Butler, 180.
- Lyons sandstone, Pennsylvanian, Colorado: Richardson, 931.
- McAlester shale, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- McBean formation, Eocene, Georgia: Stephenson and Veatch, 1041.
- McCarthy shale, Triassic, Alaska: Martin *et al.*, 757.
- McElmo formation, Jurassic, Colorado: Butler, 180.
- McKim graywacke, pre-Cambrian, Canada: Coleman, 252.
- McKissock Grove shales, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- McLeansboro formation, Pennsylvanian, Illinois: Blatchley, 112; Kay and White, 616; Lee, 672; Udden and Shaw, 1097.
- Madison limestone, Mississippian, Montana: Calkins and Emmons, 190.
- Madison sands, Tertiary, Mississippi: Lowe, 709.
- Magnesian (Lower) limestone, Ordovician, Illinois: Blatchley, 112.
- Magothy formation, Cretaceous, New Jersey: Lewis and Kummel, 687.
- Mahoning sandstone, Pennsylvanian, Ohio: Bownocker, 126.
- Mahoning sandstone, Pennsylvanian, West Virginia: Krebs and Teets, 659.
- Malden sandstone, Pennsylvanian, West Virginia: Krebs and Teets, 659.
- Manasquan marl, Cretaceous, New Jersey: Lewis and Kummel, 687.
- Manastash formation, Eocene, Washington: Saunders, 954.
- Mancos formation, Cretaceous, Colorado: Butler, 180.
- Mangum dolomite member, Permian, Oklahoma: Shannon and Trout, 983.
- Manitoban limestones, Devonian, Manitoba: Wallace, 1129.
- Mankou limestone, Ordovician, Colorado: Richardson, 931.
- Manitoulin member, Silurian, Ontario: Malcolm, 750.
- Manix beds, Pleistocene, California: Merriam, 787.
- Manlius limestone, Silurian, New Jersey: Lewis and Kummel, 687.
- Manning clays, Tertiary, Texas: Dumble, 377.
- Marcellus shale, Devonian, New Jersey: Lewis and Kummel, 687.
- Marianna limestone, Oligocene, Florida: Cooke, 264; Matson, 764.
- Marine beds, Eocene, Texas and Mexico: Dumble, 380.
- Marine beds, Tertiary, Mexico: Dumble, 378.
- Marks Head marl, Miocene, Georgia: Stephenson and Veatch, 1041.
- Marshalltown formation, Cretaceous, New Jersey: Lewis and Kummel, 687.
- Martin limestone, Devonian, Arizona: Ransome, 908.
- Martinez (?) formation, Eocene, California: Anderson and Pack, 21.
- Martinsburg shale, Ordovician, New Jersey: Lewis and Kummel, 687.
- Marysville sands, Pleistocene, British Columbia: Schofield, 962.
- Masset volcanics, Tertiary, British Columbia: Mackenzie, 736.
- Matagami series, pre-Cambrian, Canada: Coleman, 252.
- Matewan sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511; Krebs and Teets, 659.
- Matfield shale, Permian, Oklahoma: Shannon and Trout, 983.
- Mauch Chunk series, Mississippian, West Virginia: Hennen and Gawthrop, 510.
- Maude formation, Jurassic-Triassic, British Columbia: Mackenzie, 736.
- Mayes formation, Mississippian, Oklahoma: Shannon and Trout, 983; Snider, 1019.
- Maysville member, Ordovician, Kentucky: Miller, 802.
- Mayville limestone, Wisconsin: Savage, 955.
- Maywood formation, Silurian (?), Montana: Calkins and Emmons, 190.
- Meadow limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Medicine Lodge gypsum, Permian, Oklahoma: Shannon and Trout, 983.
- Medina formation, Silurian, Ontario: Malcolm, 750.
- Medina red rock, Silurian, Ohio: Bonine, 117.
- Medina shale, Silurian, Ohio: Bownocker, 126.
- Mendez shale, Eocene, Mexico: DeGolyer, 341.
- Mendez shales, Cretaceous and Eocene, Mexico: Garfias, 434.
- Mendez shales, Eocene, Mexico: DeGolyer, 342.
- Merchantville clay, Cretaceous, New Jersey: Lewis and Kummel, 687.
- Mesa Verde formation, Cretaceous, Colorado: Butler, 180.
- Mesa Verde formation, Cretaceous, Wyoming: Hares, 490.
- Mescal limestone, Cambrian, Arizona: Ransome, 908, 909.
- Miami oolite, Pleistocene, Florida: Matson, 764.
- Midway, Eocene, Texas and Mexico: Dumble, 380.
- Midway, Tertiary, Mexico: Dumble, 378.
- Midway formation, Eocene, Georgia: Stephenson and Veatch, 1041.
- Midway group, Tertiary: Berry, 98.
- Midway group, Tertiary, Mississippi: Lowe, 709.
- Midway volcanic group, Miocene, British Columbia: Drysdale, 374.
- Million bed, Ordovician, Kentucky: Miller, 802.
- Millsap limestone, Mississippian, Colorado: Richardson, 931.

- Missouri group, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Mitchell limestone, Indiana: Beede *et al.*, 91.
- Mitchell limestone, Mississippian: Malott, 751.
- Moberly sandstone, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Mohawkian series, Ordovician, Kentucky: Miller, 802.
- Monitor sandstone, Pennsylvanian, West Virginia: Krebs and Teets, 659.
- Monongahela formation, Carboniferous, Pennsylvania: Pa. Top. G. S., 870.
- Monroe limestone, Silurian, Ohio: Bownocker, 126.
- Monroe formation, Silurian, Ohio: Hubbard *et al.*, 562.
- Monroe formation, Silurian, Ontario: Malcolm, 750; Williams, 1189.
- Monitor sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Montana group, Cretaceous, Alberta: Dowling, 367.
- Montana group, Cretaceous, Colorado: Beekly, 92; Richardson, 931.
- Montana group, Cretaceous, Montana: Bowen, 119.
- Montana group, Cretaceous, Wyoming: Hintze, 530.
- Monterey group, Miocene, California: Anderson and Pack, 21; Clark, 223.
- Moody's Branch green marls, Tertiary, Mississippi: Lowe, 709.
- Moorefield shale, Mississippian, Arkansas: Girty, 450.
- Moose metargillite, pre-Cambrian, British Columbia: Daly, 302.
- Moreno formation, Cretaceous, California: Anderson and Pack, 21.
- Morrison formation, Cretaceous or Jurassic, Colorado: Richardson, 931.
- Morrison formation, Jurassic, Colorado: Butler, 180.
- Morrison formation, Jurassic or Cretaceous, Colorado: Beekly, 92.
- Morrison formation, Jurassic (?) or Cretaceous, Wyoming: Hintze, 530.
- Morrison formation, New Mexico: Darton, 309.
- Morrow formation, Pennsylvanian, Oklahoma: Snider, 1019.
- Morrow group, Carboniferous, Arkansas and Oklahoma: Mather, 763.
- Mount Hope bed, Ordovician, Kentucky: Miller, 802.
- Mount Laurel sands, Cretaceous, New Jersey: Lewis and Kummel, 687.
- Mount Roberts formation, Carboniferous, British Columbia: Drysdale, 375.
- Mount Selman formation, Eocene, Texas: Burchard, 158.
- Mowry shale, Cretaceous, Wyoming: Hares, 490.
- Moyle sills, pre-Cambrian, British Columbia: Schofield, 962.
- Nakimu formation, pre-Cambrian, British Columbia: Daly, 302.
- Naknek formation, Jurassic, Alaska: Martin *et al.*, 757.
- Nanahala formation, Tertiary: Berry, 98.
- Nashua marl, Pliocene, Florida: Matson, 764.
- Naugatuck sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Navasota sands, Tertiary, Texas: Dumble, 377.
- Navesink marl, Cretaceous, New Jersey: Lewis and Kummel, 687.
- Nehawka limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Nelhart quartzite, pre-Cambrian, Montana: Calkins and Emmons, 190.
- Nelson granodiorite, Jurassic, British Columbia: Drysdale, 374.
- Nemaha formation, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Neosho member, Permian, Kansas: Shannon and Trout, 983.
- New Albany shale, Devonian, Kentucky: Butts, 182.
- Newark group, Triassic, New Brunswick and Nova Scotia: Powers, 894.
- Newark group, Triassic, New Jersey: Lewis and Kummel, 687.
- Newland formation, pre-Cambrian, Montana: Calkins and Emmons, 190.
- Newman limestone, Mississippian, Tennessee: Glenn, 455.
- New Providence shale, Mississippian, Kentucky: Butts, 182.
- New River group, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Krebs and Teets, 659.
- New Scotland beds, Devonian, New Jersey: Lewis and Kummel, 687.
- Niagara formation, Silurian, Ontario: Malcolm, 750.
- Niagara limestone, Silurian, Ohio: Bownocker, 126.
- Niagara limestones, Silurian, Saskatchewan and Manitoba: McInnes, 670.
- Nicola series, Triassic-Jurassic, British Columbia: Daly, 302.
- Nikolai greenstone, Alaska: Mertie, 799.
- Nikolai greenstone, Triassic(?) or Carboniferous(?), Alaska: Martin *et al.*, 757.
- Niobrara formation, Cretaceous, Colorado: Beekly, 92; Butler, 180; Richardson, 931.
- Niobrara formation, Cretaceous, Wyoming: Hares, 490.
- Niobrara shales, Cretaceous, Saskatchewan: McInnes, 734.
- Nipple Mountain series, Miocene, British Columbia: Reinecke, 920.
- Noix oolite, Silurian, Missouri: Keyes, 631.
- North Fork shale, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- North Mountain basalt, Triassic, New Brunswick and Nova Scotia: Powers, 894.
- North Park formation, Tertiary, Colorado: Beekly, 92.
- Nowata shales, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Nugget sandstone, Triassic, Idaho: Mansfield, 753.
- Nussbaum formation, Pliocene, Colorado: Butler, 180.
- Nuttall sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Oak Grove sand, Oligocene, Florida: Matson, 764.
- Oak Grove sands, Tertiary, Florida: Dall, 301.
- Oakville sand, Miocene, Texas: Dumble, 377, 380.
- Ocala formation, Eocene, Florida: Sellards, 978.
- Ocala limestone, Eocene, Florida: Cooke, 268; Sellards, 978.
- Ocala limestone, Oligocene, Florida: Matson, 764.

- Ocala limestone, Tertiary, Florida: Dall, 301.
- Oceana limestone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Ogalla formation, Pliocene, Colorado: Butler, 180.
- Ogdenburg (Beekmantown) dolomite, New York: Chadwick, 211.
- Ohioshale, Devonian, Ohio: Hubbard *et al.*, 542.
- Ohioshale group, Devonian, Ohio: Bonine, 117.
- Okefenokee formation, Pleistocene, Georgia: Stephenson and Veatch, 1041.
- Olentangy shale, Devonian, Ohio: Bonine, 117; Grabau, 464; Hubbard *et al.*, 562; Stauffer, 1036.
- Olentangy shale, Devonian, Ontario: Stauffer, 1035.
- Olentangy shale member, Devonian, Ontario: Malcolm, 750.
- Onalaska sands, Tertiary, Texas: Dumble, 377.
- Onaping tuff, pre-Cambrian, Canada: Coleman, 262.
- Onondaga formation, Devonian, Ontario: Malcolm, 750.
- Onondaga limestone, Devonian, New Jersey: Lewis and Kimmel, 687.
- Onondaga limestone, Devonian, Ontario: Stauffer, 1035.
- Onwatin slate, pre-Cambrian, Ontario: Coleman, 252.
- Orca group, Jurassic or Cretaceous, Alaska: Martin *et al.*, 757.
- Orca group, Mesozoic, Alaska: Capps and Johnson, 203.
- Oread limestone, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Oread limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Oreapolis limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Orinda formation, Pliocene, California: Clark, 223.
- Oriskany formation, Devonian, New Jersey: Lewis and Kimmel, 687.
- Oriskany formation, Devonian, Ontario: Malcolm, 685; Stauffer, 950.
- Osgood beds, Silurian, Ohio: Bownocker, 126.
- Osgood formation, Silurian, Kentucky: Butts, 182.
- Packard rhyolite, Tertiary, Utah: Crane, 272, 273.
- Pageton sandstone, Mississippian, West Virginia: Hennen and Gawthrop, 510.
- Paint Lick bed, Ordovician, Kentucky: Miller, 802.
- Paint slate formation, Algonkian, Michigan: Allen and Barrett, 12.
- Palm Beach limestone, Pleistocene, Florida: Matson, 699.
- Palms formation, Algonkian, Michigan: Allen and Barrett, 12.
- Palms formation, pre-Cambrian, Michigan: Allen and Barrett, 13.
- Panama formation, Oligocene, Panama Canal Zone: MacDonald, 729.
- Panhandle beds, Miocene, Texas: Baker, 38.
- Panoche formation, Cretaceous, California: Anderson and Pack, 21.
- Panther conglomerate, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Papagallos shale, Cretaceous, Mexico: Dumble, 378.
- Papagallos shales, Cretaceous, Mexico: Garfias, 434.
- Papagallos shales, Eocene, Mexico: DeGolyer, 342.
- Papagallos shales, Mexico: Dumble, 379.
- Parkman sandstone, Cretaceous, Wyoming: Hares, 490.
- Parrish formation, Pennsylvanian, Nova Scotia: Hyde, 572.
- Paskapoo formation, Cretaceous-Tertiary, Alberta: Dowling, 370.
- Pawnee limestone, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Pawnee limestone, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Peace River sandstone, Cretaceous, Alberta: Dowling, 370.
- Peay sandstone, Cretaceous, Wyoming: Hintze, 530.
- Peerless sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511.
- Peninsular limestone, Tertiary, Florida: Dall, 301.
- Pennington shale, Mississippian, Tennessee: Glenn, 455.
- Pennsylvanian series, Carboniferous, Illinois: Lee, 672.
- Pensauken formation, Pleistocene, New Jersey: Lewis and Kimmel, 687.
- Peorian or postloessial soil, Pleistocene: Leverett and Taylor, 686.
- Perce limestone, Devonian, Quebec: Clarke, 232.
- Perryville member, Ordovician, Kentucky: Miller, 802.
- Peshastin formation, pre-Tertiary, Washington: Saunders, 954.
- Peshastin series, Carboniferous, Washington: Smith, 1018.
- Petrolia shale, Devonian, Ontario: Stauffer, 1035.
- Petrolia shale member, Devonian, Ontario: Malcolm, 750.
- Phillips formation, pre-Cambrian, British Columbia: Schofield, 962.
- Pic d'Aurore series, Devonian, Quebec: Clarke, 232.
- Pieton granite, pre-Cambrian, New York: Cushing, 293.
- Pierpont sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Pierre formation, Cretaceous, Colorado: Butler, 180.
- Pierre shale, Cretaceous, Colorado: Beekly, 92; Richardson, 931.
- Pierre shale, Cretaceous, Saskatchewan: Rose, 950.
- Pierre shale, Cretaceous, Wyoming: Hintze, 530.
- Pikes Peak granite, pre-Cambrian, Colorado: Richardson, 931.
- Pinal schist, pre-Cambrian, Arizona: Ransome, 908, 909.
- Pinedale stage, Pleistocene, Wyoming: Blackwelder, 108.
- Pine Mountain formation, pre-Cambrian or Cambrian, Georgia: Galpin, 429.
- Pineville sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Pinyon conglomerate, Eocene, Wyoming: Blackwelder, 108.
- Pioneer shale, Cambrian, Arizona: Ransome, 908, 909.
- Pitkin limestone, Mississippian, Oklahoma: Shannon and Trout, 983; Snider, 1019.
- Pittsburgh red shale, Pennsylvanian, West Virginia: Krebs and Teets, 659.
- Platte shales, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Plattsburg limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.

- Plattsburgh limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Pleasanton formation, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Pocahontas group, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Krebs and Teets, 659.
- Pocahontas (Lower) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Pocahontas (Upper) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Pochuck gneiss, pre-Cambrian, New Jersey: Lewis and Kummel, 687.
- Point Edward formation, Pennsylvanian, Nova Scotia: Hyde, 572.
- Point Pleasant beds, Ordovician, Ohio: Bownocker, 126.
- Poleon Canyon formation, Eocene, Colorado: Butler, 180.
- Pomeroy sandstone, Pennsylvanian, Ohio: Bownocker, 126.
- Ponce chalky limestones, Tertiary, Porto Rico: Berkeley, 96.
- Popo Agle beds, Triassic, Wyoming: Branson, 132.
- Porter's Creek formation, Tertiary, Mississippi: Lowe, 709.
- Port Ewen beds, Devonian, New Jersey: Lewis and Kummel, 687.
- Port Hudson formation, Pleistocene, Mississippi: Lowe, 709.
- Port Lambton beds, Devonian, Ontario: Malcolm, 750; Stauffer, 1035.
- Portneuf limestone, Triassic, Idaho: Mansfield, 753.
- Portsmouth shale member, Mississippian, Ohio: Hyde, 573.
- Potadam formation, Cambrian, Canada: Malcolm, 750.
- Potadam sandstone, New York: Chadwick, 211.
- Pottsville formation, Carboniferous, Pennsylvania: Pa. Top. G. S., 870.
- Pottsville formation, Pennsylvanian, Illinois: Blatchley, 112; Kay and White, 616; Lee, 672; Morse and Kay, 828; Udden and Shaw, 1097.
- Pottsville series, Pennsylvanian, West Virginia: Krebs and Teets, 659.
- Poxino Island shale, Silurian, New Jersey: Lewis and Kummel, 687.
- Presque Isle granite, Algonkian, Michigan: Allen and Barrett, 12.
- Presque Isle granite, pre-Cambrian, Michigan: Allen and Barrett, 13.
- Preston limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Prichard formation, pre-Cambrian, Montana: Calkins and Emmons, 190.
- Princeton series, Algonkian, Michigan: Allen and Barrett, 12.
- Prout series, Devonian, Ohio: Grabau, 464.
- Providence sand member, Cretaceous, Georgia: Stephenson and Veatch, 1041.
- Purcell lava, pre-Cambrian, British Columbia: Schofield, 962.
- Purcell series, pre-Cambrian, British Columbia: Schofield, 962.
- Purcell sills, pre-Cambrian, British Columbia: Schofield, 962.
- Purgatoire formation, Cretaceous, Colorado: Richardson, 931.
- Purgatory (or Purgatoire) formation, Comanchean, Colorado: Butler, 180.
- Puyallup, Pleistocene, Washington: Bretz, 135.
- Puyer formation, Eocene, Washington: Daniels, 305.
- Quadrant formation, Pennsylvanian, Montana: Calkins and Emmons, 190.
- Quartermaster formation, Permian, Oklahoma: Shannon and Trout, 983.
- Quartermaster formation, Permian, Texas: Baker, 38.
- Quebradillas reef limestones, Tertiary, Porto Rico: Berkeley, 96.
- Queen Charlotte series, Cretaceous, British Columbia: Mackenzie, 736.
- Quinnimont sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Raccoon member, Mississippian, Ohio: Hyde, 573.
- Rainbow series, post-Franciscan, California: Stalder, 1030.
- Raleigh (Lower) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Raleigh (Upper) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Raritan formation, Cretaceous, New Jersey: Lewis and Kummel, 687.
- Raton formation, Eocene, Colorado: Butler, 180.
- Ravalli formation, pre-Cambrian, Montana: Calkins and Emmons, 190.
- Raytown limestone, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Reagan sandstone, Cambrian (?), Oklahoma: Shannon and Trout, 983.
- Red Bank sand, Cretaceous, New Jersey: Lewis and Kummel, 687.
- Red Beds (Chugwater formation), Permian and Triassic, Wyoming: Branson, 132.
- Red Bluff clay member, Oligocene, Florida: Cooke, 268.
- Reynosa limestone, Tertiary, Mexico: Dumble, 378.
- Ricardo formation, Pliocene, California: Merriam, 787.
- Richmond, Paleozoic, Michigan: Case and Robin, son, 210.
- Richmond formation, Ordovician, Ohio: Bownocker, 126.
- Richmond group, Ordovician, Kentucky: Butts, 182.
- Richmond shale, Ordovician, Ontario: Malcolm, 750.
- Ridgway till, Eocene, Colorado: Atwood, 33.
- Rift shale, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Ripley formation, Cretaceous, Georgia: Stephenson and Veatch, 1041.
- Ripley formation, Cretaceous, Mississippi: Lowe, 709.
- Riverside sandstone, Indiana: Beede, *et al.*, 91.
- Roan gneiss, pre-Cambrian, Georgia: Galpin, 429.
- Rochester shale, Silurian, Ontario: Malcolm, 750.
- Rock Creek or Tule beds, Pleistocene, Texas: Baker, 38.
- Rocky Mountain limestone, Cretaceous, Alberta: Dowling, 371.
- Romney shales, Devonian, West Virginia: Prosser, 903.

- Rondout limestone, Silurian, New Jersey: Lewis and Kümmel, 687.
- Rossville formation, pre-Cambrian, British Columbia: Schofield, 962.
- Rosewood shale, Mississippian, Kentucky: Butts, 182.
- Roslyn formation, Eocene, Washington: Saunders, 954.
- Ross formation, pre-Cambrian and Cambrian, British Columbia: Daly, 302.
- Ross limestone, Triassic, Idaho: Mansfield, 753.
- Rulo limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Rustler formation, Permian, Texas: Baker, 38.
- Rustler Spring formation, Cretaceous or Jurassic, Texas: Udden, 1095.
- St. Clair marble, Silurian, Oklahoma: Shannon and Trout, 983; Snider, 1019.
- St. Eugene interglacial epoch, Pleistocene, British Columbia: Schofield, 962.
- St. Eugene silts, Pleistocene, British Columbia: Schofield, 962.
- Ste. Genevieve limestone, Mississippian, Illinois: Blatchley, 112.
- St. Joe limestone member, Mississippian, Arkansas: Girty, 451.
- St. Joe limestone member, Mississippian, Oklahoma: Snider, 1019.
- St. Louis limestone, Mississippian, Illinois: Blatchley, 112; Morse and Kay, 828.
- St. Mary sills, pre-Cambrian, British Columbia: Schofield, 962.
- St. Peter sandstone, Ordovician, Illinois: Blatchley, 112.
- St. Piran formation, Cambrian, British Columbia: Daly, 302.
- Salem formation, Mississippian, Illinois: Morse and Kay, 828.
- Salem limestone, Mississippian, Indiana: Malott, 751.
- Salem oolitic limestone, Indiana: Beede, *et al.*, 91.
- Salem (Spergen) limestone, Mississippian, Illinois: Blatchley, 112.
- Salina formation, Silurian, Ontario: Malcolm, 750; Williams, 1189.
- Salmon Arm formation, pre-Cambrian, British Columbia: Daly, 302.
- Saltsburg sandstone, Pennsylvanian, West Virginia: Krebs and Teets, 659.
- Saluda limestone, Ordovician, Kentucky: Butts, 182.
- Salvisa bed, Ordovician, Kentucky: Miller, 802.
- Sandy Huff shale, Pennsylvania, West Virginia: Hennen and Gawthrop, 510.
- San Felipe beds, Eocene, Mexico: DeGolyer, 341.
- San Felipe limestone, Cretaceous, Mexico: Garfias, 434.
- San Felipe series, Eocene, Mexico: DeGolyer, 342.
- San Fernando, Oligocene, Mexico: Dumble, 380.
- San Fernando beds, Oligocene, Mexico: Garfias, 434.
- Sangamon interglacial stage, Pleistocene: Leverett and Taylor, 686.
- San Juan formation, Pleistocene, Porto Rico: Berkeley, 96.
- San Juan limestone, Cretaceous, Mexico: Dumble, 378.
- San Juan series, Mexico: Dumble, 379.
- San Pablo formation, Miocene, California: Anderson and Pack, 21.
- San Pablo group, Tertiary (Miocene), California: Clark, 220.
- San Sebastian shales, Tertiary, Porto Rico: Berkeley, 96.
- Santa Clara formation, Tertiary or Quaternary, California: Clark, 223.
- Santa Margarita (?) formation, Miocene, California: Anderson and Pack, 21.
- Satilla formation, Pleistocene, Georgia: Stephenson and Veatch, 1041.
- Satsop formation, Pleistocene, Washington: Bretz, 135.
- Savanna sandstone, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Sawatch sandstone, Cambrian, Colorado: Richardson, 931.
- Scanlan conglomerate, Cambrian, Arizona: Ransome, 908, 909.
- Scarboro beds, Pleistocene, Canada: Coleman, 255.
- Scioto Valley shale, Mississippian, Ohio: Hyde, 573.
- Scoots Bay formation, Triassic, New Brunswick and Nova Scotia: Powers, 894.
- Scranton shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Seine River series, pre-Cambrian, Canada: Coleman, 252.
- Selkirk series, pre-Cambrian, British Columbia: Daly, 302.
- Sellersburg limestone, Devonian, Kentucky: Butts, 182.
- Selma chalk formation, Cretaceous, Mississippi: Lowe, 709.
- Seminole conglomerate, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Senora formation, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Severy shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Shannon sand, Cretaceous, Wyoming: Huntley, 568.
- Shark River marl, Tertiary, New Jersey: Lewis and Kümmel, 687.
- Shawangunk conglomerate, Silurian, New Jersey: Lewis and Kümmel, 687.
- Shawnee formation, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Sheppard formation, Jurassic?, British Columbia: Schofield, 962.
- Sheppard granite porphyry, Miocene, British Columbia: Drysdale, 375.
- Shimer gypsum, Permian, Oklahoma: Shannon and Trout, 983.
- Shoal Creek limestone member, Pennsylvanian, Illinois: Lee, 672; Udden and Shaw, 1097.
- Shoal River marl, Oligocene, Florida: Matson, 764.
- Short Creek oolite member, Mississippian, Arkansas: Girty, 451.
- Shoshone series, Eocene, Colorado: Butler, 180.
- Shuswap terrane, pre-Cambrian, British Columbia: Daly, 302.
- Sicamous formation, pre-Cambrian, British Columbia: Daly, 302.
- Silo sandstone, Cretaceous, Oklahoma: Shannon and Trout, 983.
- Silver Hill formation, Cambrian, Montana: Calkins and Emmons, 190.

- Silver Plume granite, pre-Cambrian, Colorado: Bastin, 81.
- Simpson formation, Ordovician, Oklahoma: Shannon and Trout, 983.
- Sir Donald formation, Cambrian, British Columbia: Daly, 302.
- Siye formation, pre-Cambrian, British Columbia: Schofield, 962.
- Skidgate sandstones and shales, Cretaceous, British Columbia: Mackenzie, 736.
- Skomn sediments, Tertiary, British Columbia: Mackenzie, 736.
- Skinnemunk conglomerate, Devonian, New Jersey: Lewis and Kimmel, 687.
- Skwentna group, Triassic? or Carboniferous?, Alaska: Martin *et al.*, 757.
- Smoky River shales, Cretaceous, Alberta: Dowling, 370.
- Snake Creek beds, Pliocene, Nebraska: Sinclair, 919.
- Snake River stage, Pliocene, Nebraska: Barbour, 63.
- Snoqualmie granodiorite, Washington: Smith, 1018.
- Sodus shale, Silurian, Ontario: Malcolm, 750.
- South Bend limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Spargen limestone, Mississippian, Kentucky: Butts, 182.
- Spokane formation, pre-Cambrian, Montana: Calkins and Emmons, 190.
- Spring Creek limestone, Mississippian, Arkansas: Girty, 450.
- Springfield limestone, Silurian, Ohio: Bownocker, 126.
- Springvale sandstone, Devonian, Ontario: Stauffer, 1035.
- Standley shale, Oklahoma: Shannon and Trout, 983.
- Stanukovich shale, Cretaceous, Alaska: Martin *et al.*, 757.
- Stanton limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Steele shale, Cretaceous, Wyoming: Hares, 490.
- Steeprock series, pre-Cambrian, Canada: Coleman, 252.
- Stewartville, Paleozoic, Michigan: Case and Robinson, 210.
- Stockton formation, Triassic, New Jersey: Lewis and Kimmel, 687.
- Stockton limestone, Pennsylvanian, West Virginia: Krebs and Teets, 659.
- Stonewall series, Silurian, Manitoba: Wallace, 1119.
- Stormville sandstone, Devonian, New Jersey: Lewis and Kimmel, 687.
- Stringtown shale, Ordovician, Oklahoma: Shannon and Trout, 983.
- Stuart shale, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Sturm limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Sudbury series, pre-Cambrian, Canada: Coleman, 252.
- Sunbeam monzonite, Tertiary, Utah: Crane, 272, 273.
- Sunbury shale, Mississippian, Ohio: Bonine, 117; Hubbard *et al.*, 562; Hyde, 573.
- Sunbury shales, Mississippian, Ohio: Bownocker, 126.
- Sundance formation, Jurassic, Colorado: Butler, 180.
- Sunday quartzite, Algonkian, Michigan: Allen and Barrett, 12.
- Sunday quartzite, pre-Cambrian, Michigan: Allen and Barrett, 13.
- Sunrise group, Paleozoic, Alaska: Martin *et al.*, 757.
- Swansea rhyolite, Tertiary, Utah: Crane, 272.
- Swauk formation, Eocene, Washington: Saunders, 954.
- Swauk sandstone, Eocene, Washington: Smith, 1018.
- Sycamore limestone, Devonian, Oklahoma: Shannon and Trout, 983.
- Sylamore sandstone member, Devonian, Oklahoma: Shannon and Trout, 983.
- Sylamore sandstone member, Devonian(?), Oklahoma: Snider, 1019.
- Sylvan shale, Ordovician, Oklahoma: Shannon and Trout, 983.
- Sylvania sandstone member, Silurian, Ontario: Malcolm, 750.
- Talhina chert, Oklahoma: Shannon and Trout, 983.
- Tallahatta buhrstone, Tertiary, Alabama and Mississippi: Berry, 98.
- Tallahatta formation, Tertiary, Mississippi: Lowe, 709.
- Tallulah Falls quartzite, Georgia: Galpin, 429.
- Tamasopo limestone, Cretaceous, Mexico: Garfias, 434; DeGolyer, 341; Dumble, 379.
- Tampa formation, Oligocene, Florida: Matson, 764; Sellards, 978.
- Tampa limestone, Oligocene, Florida: Sellards, 978.
- Tampa limestone, Tertiary, Florida: Dall, 301.
- Tampa silex beds, Oligocene, Florida: Sellards, 978.
- Taneum andesite, Miocene, Washington: Saunders, 954.
- Tarkio limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Tarkio limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Tatina group, Ordovician, Alaska: Martin *et al.*, 757.
- Tazin series, pre-Cambrian, Alberta and Northwest Territory: Camsell, 194.
- Tazin series, pre-Cambrian, Alberta and Saskatchewan: Alcock, 5.
- Teaway basalt, Eocene, Washington: Saunders, 954.
- Teapot sandstone, Cretaceous, Wyoming: Hares, 490.
- Tecovas formation, Triassic, Texas: Baker, 38.
- Tecumseh shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Tecumseh shales, Pennsylvanian, Nebraska and Kansas: Condra and Bengtson, 258.
- Tejon formation, Eocene, California: Anderson and Pack, 21; Clark, 223.
- Tejon group, Eocene, California and Washington: Dickerson, 348.
- Temiscaming series, pre-Cambrian, Canada: Coleman, 252.
- Tetro limestone, Paleozoic, Utah: Crane, 272, 273.

- Thayne group, Triassic, Idaho: Mansfield, 753.
 Theresa formation, New York: Chadwick, 211.
 Thorold sandstone member, Silurian, Ontario: Malcolm, 750.
 Three Forks formation, Devonian, Montana: Haynes, 502.
 Thurman sandstone, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
 Timiskamian, pre-Cambrian, Ontario: Miller and Knight, 806.
 Timpas formation, Cretaceous, Colorado: Butler, 180.
 Tintic quartzite, Paleozoic, Utah: Crane, 272, 273.
 Tintic slate, Paleozoic, Utah: Crane, 273.
 Tinton bed, Cretaceous, New Jersey: Lewis and Kùmmel, 687.
 Tippah sandstone, Tertiary, Mississippi: Lowe, 709.
 Toboso conglomerate, Mississippian, Ohio: Hyde, 573.
 Tococa quartzite, Georgia: Galpin, 429.
 Tonkawatia form, pre-Cambrian, British Columbia: Daly, 302.
 Tonto group, Cambrian, Arizona: Ransome, 908.
 Tonzona group, Silurian or Devonian, Alaska: Martin *et al.*, 757.
 Topeka limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
 Torchlight sandstone, Cretaceous, Wyoming: Hintze, 530.
 Tordrillo formation, Jurassic, Alaska: Martin *et al.*, 692.
 Tornado limestone, Carboniferous, Arizona: Ransome, 908.
 Toro limestone, Pliocene or Pleistocene, Panama Canal Zone: MacDonald, 729.
 Toronto formation, Pleistocene, Canada: Coleman, 255.
 Traverse formation, Devonian, Ohio: Bownocker, 126.
 Trenton formation, Ordovician, Canada: Malcolm, 750.
 Trinidad formation, Cretaceous, Colorado: Butler, 180.
 Trinity sand, Cretaceous, Oklahoma: Shannon and Trout, 983.
 Trout Lake conglomerate, pre-Cambrian, Canada: Coleman, 252.
 Troy quartzite, Cambrian(?), Arizona: Ransome, 908, 909.
 Trujillo formation, Triassic, Texas: Baker, 38.
 Trujillo Alto limestone, Cretaceous, Porto Rico: Berkey, 96.
 Tshimakin formation, pre-Cambrian, British Columbia: Daly, 302.
 Tulare(?) formation, Pliocene and Pleistocene, California: Anderson and Pack, 21.
 Tule or Rock Creek beds, Pleistocene, Texas: Baker, 38.
 Tusahoma formation, Tertiary: Berry, 98.
 Tuscaloosa formation, Cretaceous, Mississippi: Lowe, 709.
 Tuscan tuff, Tertiary, California: Bryan, 156.
 Tuscumbia chert, Mississippian, Mississippi: Lowe, 709.
 Tuxedni sandstone, Jurassic, Alaska: Martin *et al.*, 757.
 Tuxpan beds, Miocene, Mexico: Garfas, 434.
 Tye soda granite, Washington: Smith, 1018.
 Tyler slate, Algonkian, Michigan: Allen and Barrett, 12.
 Tyler slate, pre-Cambrian, Michigan: Allen and Barrett, 13.
 Tyner formation, Ordovician, Oklahoma: Shannon and Trout, 983; Snider, 1019.
 Tyrone limestone, Ordovician, Kentucky: Miller, 802.
 Uncas shale, Permian, Oklahoma: Shannon and Trout, 983.
 Unga formation, Tertiary, Alaska: Martin *et al.*, 757.
 Union limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
 Union Pass cycle, Pleistocene, Wyoming: Blackwelder, 106.
 Utica group, Ordovician, Canada: Malcolm, 750.
 Valdes group, Paleozoic, Alaska: Capps and Johnson, 203; Martin *et al.*, 757.
 Vanceburg member, Mississippian, Ohio: Hyde, 573.
 Vancouver group, Jurassic-Triassic, British Columbia: Mackenzie, 736.
 Vaqueros formation, Miocene, California: Anderson and Pack, 21.
 Vashon, Pleistocene, Washington: Bretz, 135.
 Vermejo formation, Cretaceous, Colorado: Butler, 180.
 Vicksburg formation, Oligocene, Georgia: Stephenson and Veatch, 1041.
 Vicksburg group, Oligocene, Florida: Cooke, 268; Matson, 764.
 Vicksburg group, Tertiary, Mississippi: Lowe, 709.
 Villas shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.
 Vincentown sand, Cretaceous, New Jersey: Lewis and Kùmmel, 687.
 Vinton member, Mississippian, Ohio: Hyde, 573.
 Viola limestone, Ordovician, Oklahoma: Shannon and Trout, 983.
 Virgelle sandstone member, Cretaceous, Montana: Bowen, 119.
 Vivian sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
 Wabauunsee formation, Pennsylvanian, Missouri: Hinds and Greene, 529.
 Waccamaw formation, Tertiary, North Carolina and South Carolina: Gardner, 432.
 Wahnapiitae quartzite, pre-Cambrian, Canada: Coleman, 252.
 Walker Ridge shales, post-Franciscan, California: Stalder, 1030.
 Wallace group, Mesozoic, British Columbia: Reinecke, 920.
 Wall Creek sand, Cretaceous, Wyoming: Huntley, 568.
 Waldron shale, Silurian, Kentucky: Butts, 182.
 Wapanucks limestone, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
 Wapiti River sandstone, Cretaceous, Alberta: Dowling, 370.
 Wardner formation, Mississippian, British Columbia: Schofield, 962.

- War Eagle (Lower) sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510; Hennen and Reger, 511.
- Warrensburg sandstone, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Warsaw formation, Mississippian, Illinois: Morse and Kay, 828.
- Warsaw limestone, Mississippian, Kentucky: Butts, 182.
- Washington formation, Permian, Pennsylvania: Pa. Top. G. S., 870.
- Waverly formations, Mississippian, Ohio: Hyde, 573.
- Waynesville limestone, Ordovician, Kentucky: Butts, 182.
- Wedington sandstone member, Mississippian, Oklahoma: Snider, 1019.
- Weeping Water limestone, Pennsylvanian, Nebraska: Condra and Bengtson, 258.
- Weich sandstone, Pennsylvanian, West Virginia: Hennen and Gawthrop, 510.
- Wellborn sand, Eocene, Tex.: Dumble, 377.
- Wenonah sands, Cretaceous, New Jersey: Lewis and Kummel, 687.
- Westkettle quartz diorite, Jurassic(?), British Columbia: Reinecke, 920.
- Weston shale member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- West Union limestone, Silurian, Ohio: Bownocker 126.
- Wetumka shale, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Wewoka formation, Carboniferous, Oklahoma: Girty, 448.
- Wewoka formation, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Wharncliffe (Dotson) sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511.
- Whitpool sandstone member, Silurian, Ontario: Malcolm, 750.
- White Beach limestone, Tertiary, Florida: Dall, 301.
- Whitehorse sandstone, Permian, Oklahoma: Shannon and Trout, 983.
- White River formation, Oligocene, North and South Dakota: Lloyd and Hares, 606.
- Whitetail conglomerate, Tertiary (?), Arizona: Ransome, 908.
- Whitewater series, pre-Cambrian, Canada: Coleman, 252.
- Wichita division, Permian, Texas: Richard, 928.
- Wichita formation, Permian, Oklahoma: Wegmann, 1156.
- Wichita formation, Permian, Texas: Baker, 38.
- Wichita formation, Permian-Carboniferous, Texas: Case, 206.
- Widder beds, Devonian, Ontario: Stauffer, 1035.
- Wild Cat series, Pliocene, California: Stalder, 1030.
- Williamson sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Williamson shale member, Silurian, Ontario: Malcolm, 750.
- Willow Creek series, Cretaceous, Alberta: Dowling, 371.
- Wilmore member, Ordovician, Kentucky: Miller, 802.
- Wilson formation, Pennsylvanian, Oklahoma: Shannon and Trout, 983.
- Windsor formation, Pennsylvanian, Nova Scotia: Hyde, 572.
- Winfield limestone, Permian, Oklahoma: Shannon and Trout, 983.
- Winifrede (Lower) sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Winifrede (Upper) sandstone, Pennsylvanian, West Virginia: Hennen and Reger, 511; Krebs and Teets, 659.
- Winnipegosis formation, Devonian, Manitoba: Wallace, 1129.
- Winslow formation, Pennsylvanian, Oklahoma: Snider, 1019.
- Winterset limestone member, Pennsylvanian, Missouri: Hinds and Greene, 529.
- Wisconsin deposits, Pleistocene, Illinois: Udden and Shaw, 1097.
- Wisconsin drift, Pleistocene: Leverett and Taylor, 686.
- Wisconsin drift, Pleistocene, New Jersey: Lewis and Kummel, 687.
- Wisconsin drift, Pleistocene, Ohio: Hubbard *et al.*, 562.
- Wisconsin till, Pleistocene, Colorado: Atwood, 33.
- Wolcott limestone, Silurian, Ontario: Malcolm, 750.
- Wolf Lake granite, Algonkian, Michigan: Allen and Barrett, 12.
- Wolfville sandstone, Triassic, New Brunswick and Nova Scotia: Powers, 894.
- Wood shale, Triassic, Idaho: Mansfield, 753.
- Woodburn bed, Ordovician, Kentucky: Miller, 802.
- Woodbury clay, Cretaceous, New Jersey: Lewis and Kummel, 687.
- Woodford chert, Devonian, Oklahoma: Shannon and Trout, 983.
- Woodford formation, Permian, Oklahoma: Shannon and Trout, 983.
- Wood's Bluff formation, Tertiary, Mississippi: Lowe, 709.
- Wreford limestone, Permian, Oklahoma and Kansas: Shannon and Trout, 983.
- Wycliffe drift, Pleistocene, British Columbia: Scho-

- Yakoun volcanics, Jurassic, British Columbia: Mac-
kenzie, 736.
- Yarmouth interglacial stage, Pleistocene: Leverett
and Taylor, 686.
- Yazoo clay marl, Tertiary, Mississippi: Lowe, 709.
- Yegua, Tertiary, Mexico: Dumble, 378.
- Yegua clays, Eocene, Texas and Mexico: Dumble,
380.
- Yegua clays, Tertiary, Texas: Dumble, 377.
- Yegua formation, Eocene, Texas: Burchard, 158.
- Yegua formation, Tertiary, Louisiana and Arkan-
sas: Berry, 98.
- Yellow Creek beds, Devonian, Mississippi: Lowe,
709.
- Yorktown formation, Tertiary, Virginia and North
Carolina: Gardner, 432.
- Yukon group, pre-Cambrian(?), Yukon: Cairnes,
187.

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Mar. 5, 1916

DEPARTMENT OF THE INTERIOR

FRANKLIN K. LANE, Secretary

UNITED STATES GEOLOGICAL SURVEY

GEORGE OTIS SMITH, Director

BULLETIN 665

BIBLIOGRAPHY
OF
NORTH AMERICAN GEOLOGY
FOR
1916

WITH SUBJECT INDEX

BY

JOHN W. NICKLES



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CONTENTS.

	Page.
Introduction.....	3
Serials examined.....	5
Bibliography.....	9
Outline of subject headings.....	99
Index.....	101
Lists.....	149
Chemical analyses.....	149
Minerals described.....	150
Rocks described.....	151
Geologic formations described.....	151

BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY FOR 1916, WITH SUBJECT INDEX.

By JOHN M. NICKLES.

INTRODUCTION.

The bibliography of North American geology, including paleontology, petrology, and mineralogy, for the year 1916 follows the plan and arrangement of its immediate predecessors. It includes publications bearing on the geology of the Continent of North America and adjoining islands; also Panama and the Hawaiian Islands. Papers by American writers on the geology of other parts of the world are not included. Textbooks and papers general in character by American authors are included; those by foreign authors are excluded unless they appear in American publications.

As heretofore, the papers, with full title and medium of publication and explanatory note when the title is not fully self-explanatory, are listed under the authors, arranged in alphabetic order. The author list is followed by an index to the literature listed. In this index the entries in one alphabet are of three kinds—first, subject, with various subdivisions, to enable the specialist to ascertain readily all the papers bearing on a particular subject or area; second, titles of papers, many of them abbreviated or inverted, under their leading words; and third, cross references, which have been freely used to avoid too much repetition. The subjects have been printed in black-faced type, the titles of papers and cross references in ordinary type. As it may not be always obvious which subject headings have been adopted, an outline of those used immediately precedes the index.

The bibliography of North American geology is comprised in the following bulletin of the United States Geological Survey: No. 127

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Georgia, Ben Hill County, pp. 495-517.

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Illinois, Will County, pp. 1521-1553.

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Michigan, Genesee County, pp. 1373-1407.

Missouri, Barton County, pp. 1609-1632.

Carroll County, pp. 1633-1662.

Cass County, pp. 1663-1686.

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South Carolina, Barnwell County, pp. 411-455.

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Tennessee, Putnam County, pp. 1099-1126.

Robertson County, pp. 1127-1148.

Texas, Archer County, pp. 1007-1054.

Harrison County, pp. 1055-1097.

West Virginia, Kanawha County, pp. 1179-1204.

Preston County, pp. 1205-1243.

Wisconsin, Jefferson County, pp. 1555-1609.

Whitney, Milton, and others—Continued.

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- Pope County, pp. 1221-1267.
- California, Sacramento Valley, pp. 2297-2488.
- Florida, Bradford County, pp. 648-674.
- Indian River area, pp. 675-745.
- Pinellas County, pp. 719-745.
- Georgia, Gordon County, pp. 385-400.
- Habersham County, pp. 401-444.
- Jeff Davis County, pp. 445-474.
- Jones County, pp. 475-514.
- Miller County, pp. 515-606.
- Talbot County, 607-642.
- Indiana, Delaware County, pp. 1379-1440.
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- south central, pp. 1073-1183.
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- Washington, Stevens County, pp. 2165-2295.
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OUTLINE OF SUBJECT HEADINGS.

In the following index the subject headings are printed in black-faced type. An outline of these is here given that it may be quickly seen which subject heading of two or more synonyms has been adopted. Thus "petroleum" and not "oil" nor "rock oil" has been chosen. That the specialist may see at a glance under what headings to find cognate literature, subject headings that are more or less closely related have been grouped together under the following heads: Areal or regional, general, economic, dynamic and structural, physiographic, stratigraphic or historical, paleontology, petrology, mineralogy, underground water. In the index the specific entries under the areal or regional subject headings are alphabetized under these same heads arranged in the same order, namely, general, economic, etc.

AREAL OR REGIONAL.

The States and Territories of the Union, Alabama, Alaska, etc.; The Provinces of Canada, Alberta, etc.; Greenland; Arctic regions; Mexico; the countries of Central America; the West Indies, and the single islands; the Hawaiian Islands.

GENERAL.

Associations, meetings; Addresses; Philosophy; History; Biography; Bibliography; Education; Textbooks.

Surveys; Fieldwork; Excursions; Technique; Cartography.

Classification; Nomenclature.

Geochemistry; Chemical analyses (list); Geophysics; Atmosphere; Radioactivity.

Experimental investigations; Borings; Miscellaneous.

ECONOMIC.

Ore deposits, origin; Contact phenomena.

Gold; Placers; Black sands; Silver; Quicksilver; Nickel; Cobalt; Copper; Lead; Zinc; Iron; Magnetite; Manganese; Tin.

Aluminum; Bauxite; Antimony; Bismuth; Tungsten; Vanadium; Uranium; Carnotite ores; Molybdenum; Chromic iron ore.

Platinum; Palladium; Titanium; Rutile; Rare earths; Monazite; Zircon.

Coal; Anthracite; Lignite; Peat.

Petroleum; Natural gas; Oil shales; Asphalt; Albertite; Gilsonite; Bituminous rock.

Stone; Building stone; Granite; Trap; Bluestone; Limestone; Marble; Lime; Gypsum.

Sand; Glass sand; Silica; Quartz; Quartzite; Sandstone; Gravel; Cement and cement materials; Concrete materials; Road materials.

Clay; Kaolin; Bentonite; Fire clay; Ganister; Slate; Shale; Pyrophyllite.

Serpentine; Asbestos; Steatite; Soapstone; Talc.

DYNAMIC AND STRUCTURAL.

Earth, genesis of; Earth, age of; Earth, interior of; Earth, temperature of.
Volcanism; Volcanoes; Earthquakes; Seismology; Seismographs; Mud volcanoes.

Isostasy; Orogeny; Changes of level.

Magma; Magmatic differentiation; Laccoliths; Intrusions; Dikes; Contact phenomena.

Deformation; Folding; Faulting; Unconformities.

Conglomerates; Concretions; Stalactites; Jointing; Cleavage.

Denudation; Erosion; Coast changes; Coral islands and reefs; Weathering; Caves; Sink holes; Wind work; Dunes; Loess; Landslides.

Glaciers; Glacial erosion; Glacial striæ; Potholes; Kettle holes.

Sedimentation; Eskers; Kames; Moraines.

Drainage changes.

PHYSIOGRAPHIC.

Geomorphology; Relief maps.

Plains; Prairies; Peneplains; Valleys; Cirques; Deserts; Alluvial fans; Deltas; Mounds, natural; Sink holes; Karsts; Natural bridges.

Rivers; Stream piracy; Meanders; Falls; Lakes; Swamps; Marshes; Everglades.

Terraces; Beaches; Shore lines.

STRATIGRAPHIC OR HISTORICAL.

Geologic history; Geologic time; Paleogeography; Paleogeographic maps; Paleoclimatology.

Geologic maps; Geologic formations described (list); Tables of formations; Unconformities; Borings.

Pre-Cambrian; Paleozoic (undifferentiated); Cambrian; Ordovician; Silurian; Devonian; Carboniferous; Mesozoic (undifferentiated); Triassic; Jurassic; Cretaceous; Tertiary; Quaternary; Recent.

Glacial geology; Glaciation; Drift deposits; Glacial lakes; Erratic boulders; Ice ages (ancient).

PALEONTOLOGY.

Geographic distribution; Evolution; Restorations.

Vertebrata; Man, fossil; Mammalia; Aves; Reptilia; Amphibia; Pisces; Footprints.

Invertebrata; Arthropoda; Crustacea; Trilobita; Ostracoda; Insecta; Arachnida; Myriapoda.

Mollusca; Cephalopoda; Gastropoda; Pelecypoda.

Molluscoidea; Brachlopoda; Bryozoa; Vermes.

Echinodermata; Echinoidea; Asteroidea; Crinoidea; Cystoidea.

Cœlenterata; Anthozoa; Hydrozoa; Graptolites.

Protozoa; Spongia; Foraminifera.

Paleobotany; Diatoms; Algae.

Problematica.

PETROLOGY.

Rocks, origin; Rocks, structural features; Rocks described (list); Igneous and volcanic rocks; Rock-forming minerals; Lava; Oolite; Dolomite; Pebbles.

INDEX.

(The numbers refer to entries in the bibliography.)

Abrasive.

United States: Katz, 549.

Addresses.

Dry land in geology: Coleman, 213.

Geology of Nelson and Hayes rivers: Tyrrell, 1105.

Isthmus of Panama and animal life of North and South America: Scott, 964.

Progress of geology, 1891-1915: Carney, 174.

Alabama.

Economic.

Barite: Watson and Sharshall, 1165.

Gold, Talladega County, Gold Log mine: Bastin, 49.

Marbles: Prouty, 872, 873.

Stratigraphic.

Citronelle formation: Matson, 713.

Paleontology.

Citronelle flora: Berry, 67.

Alaska.

General.

Cosna-Nowitna region: Eakin, 328.

Economic.

Antimony: Brooks, 117.

Chisana-White River district, Alaska: Capps, 170.

Chitina Valley: Moffit, 769.

Coal: U. S. Dept. Int., 1114.

Copper, Bonanza mines: Tolman, 1081. southeastern Alaska: Chapin, 186.

Gold, Chisana-White River district: Capps, 170.

Ruby-Kuskokwim region: Mertie and Harrington, 751.

southeastern Alaska: Chapin, 186.

Tolovana district: Brooks, 116.

Turnagain-Knik region: Capps, 171.

Willow Creek district: Capps, 172.

Gold, silver, and copper in 1915: Brooks, 119.

Lake Clark-Iditarod region: Smith, 1019.

Mining industry, 1915: Brooks, 115.

Alaska—Continued.

Dynamic and structural.

Barry Glacier, retreat 1910-14: Johnson, 517.

Bogoslof Volcano, changes: Powers, 857, 858.

Physiographic.

Physiographic provinces: Brooks, 118.

Yukon-Koyukuk region: Eakin, 327.

Stratigraphic.

Chisana-White River district, Alaska: Capps, 170.

Chitina Valley: Moffit, 769.

Lake Clark-Iditarod region: Smith, 1019.

Lake Iditarod region: Smith, 1018.

Ruby-Kuskokwim region: Mertie and Harrington, 751.

Tolovana district: Brooks, 116.

Triassic: Martin, 705.

Turnagain-Knik region: Capps, 171.

Yukon-Koyukuk region: Eakin, 327.

Paleontology.

Jurassic flora, Matanuska Valley: Knowlton, 599.

Alberta.

General.

Bialrmore area: Rose, 923.

Economic.

Bituminous sands, northern Alberta: Ellis, 337.

Coal: Dowling, 307.

Drumbeller field: Macaulay, 665.

Gold, North Saskatchewan River: Tyrrell, 1103.

Oil fields, correlation and structure: Dowling, 309.

Petroleum: Dowling, 309.

southern Alberta: Dowling, 308.

Phosphate, southern Alberta: Adams and Dick, 1, 2; De Schmid, 288.

Stratigraphic.

General: Adams and Dick, 2.

Banff district: De Schmid, 288.

Borings: Huntley, 504.

Alberta—Continued.**Stratigraphic—Continued.**

Rocky Mountains: Burling, 133.

Simpson Pass to Kananaskis:
Allan, 6.

Southern Alberta: Adams and Dick,
1; Slipper, 1006.

Southwestern Alberta: Stewart, 1051.

Paleontology.

Eodelphis, Red Deer River: Matthew,
721.

Ganoid fishes, Banff: Lambe, 610.

Prosaurolophus, Red Deer River:
Brown, 121.

Tree stumps, Drumheller: Hargreaves,
425.

Underground water.

Southeastern Alberta: Dowling, 310.

Alga.

Algonkian: Walcott, 1143.

Green River formation: Davis, 263.

Algonkian. *See* Pre-Cambrian.

Aluminum.

United States: Phalen, 844.

Ammonites. *See* Cephalopoda.

Amphibia.

Air-breathing Vertebrata, origin: Bar-
rell, 40.

Coal Measures: Moodie, 771.

Eurythorax: Hussakof, 506.

Permian vertebrates, osteology: Wil-
liston, 1235.

Tetrapoda, Permian: Williston, 1236.

Trimerorhachis, Texas: Williston,
1237.

Analyses, chemical. *See* *Ist*, p. 149.

Animikie. *See* Pre-Cambrian.

Anthozoa (corals).

Bahamas: Vaughan, 1133.

Cretaceous and Tertiary, California
and Oregon: Nomland, 794.

Ellesmere Land, Arctic regions, De-
vonian: Loewe, 649.

Florida: Vaughan, 1133.

Micrabacia, Upper Cretaceous: Ste-
phenenson, 1046.

Tetraseptata, classification: Grabau,
402.

Tumularia: Robinson, 914.

Antilles.**Physiographic.**

Littoral physiographic features:
Vaughan, 1132.

Antimony.

General: Joseph, 542.

Alaska: Brooks, 117.

Arizona: Joseph, 542.

British Columbia, Bridge River area:
Drysdale, 316.

Idaho, Cœur d'Alene district: Brain-
ard, 100.

Mexico: Flores, 362.

United States: Hess, 455.

Yukon, Wheaton district: Cairnes, 159.

Arachnida.

Eurypterida, habitat: O'Connell, 802;
Ruedemann, 931.

Archean. *See also* Pre-Cambrian.

Arizona, Grand Canyon: Noble and
Hunter, 793.

Arctic regions.

General: O'Neill, 808.

Paleontology.

Devonian corals, Ellesmere Land:
Loewe, 649.

Arizona.**General.**

Bibliography: Lutrell, 663.

Copper Queen cave: Beasley, 53.

Southern Arizona: Tolman, 1080.

Economic.

Building stone: Cullin, 245.

Cement materials: Cullin, 243.

Clifton-Morenci district, mineraliza-
tion: Reber, 889.

Coal: Rubel, 928.

Copper: Ely, 338; Joseph, 543.

Clifton-Morenci district: Reber, 889.
Pima County: Tolman, 1081.

Garnet deposits, Navajo Reservation:
Gregory, 406.

Gypsum: Cullin, 242.

Iron: Joseph, 544.

Jerome mining district: Provot, 874.

Lead: Joseph, 545.

Magnesite: Cullin, 240.

Mica: Cullin, 241.

Mineral production, 1915: Helkes, 443.

Minerals, useful: Willis, 1234.

Mohave County: Schrader, 956, 957.

Oatman district: Palmer, 831, 832;
Probert, 867; Ritter, 907.

Quicksilver: Joseph, 539.

Santa Cruz County: Bird, 80.

Tom Reed-Gold Road district: Ritter,
907; Sperr, 1033.

Tungsten: Rubel, 927; Taft, 1065;
Willis, 1238.

Vanadium: Joseph, 540.

Warren mining district, Bisbee: Bon-
illas *et al.*, 90.

Zinc: Joseph, 541.

Physiographic.

General: Ransome, 881.

Coon Butte: Darton, 260.

Explosion craters: Darton, 260.

Navajo country: Gregory, 405.

Tuba oasis: Gregory, 404.

Stratigraphic.

Archean complex, Granite Gorge.
Grand Canyon: Noble and
Hunter, 793.

Carrizo Mountain: Emery, 342.

Clifton-Morenci district: Reber, 889.

Jerome mining district: Provot, 874.

Mohave County: Schrader, 956.

Navajo country: Gregory, 405.

Oatman district: Palmer, 832.

Paleozoic sections, correlation: Ran-
some, 881.

Arizona—Continued.**Stratigraphic—Continued.**

Warren mining district, Bisbee: Bonillas *et al.*, 90.

Petrology.

Archean complex, Granite Gorge, Grand Canyon: Noble and Hunter, 793.

Carrizo Mountain: Emery, 342.

Mineralogy.

Antimony: Joseph, 542.

Copper minerals: Joseph, 543.

Melanochalcite, Bisbee: Hunt and Kraus, 501.

Warren mining district, Bisbee: Bonillas *et al.*, 90.

Underground water.

Navajo country: Gregory, 405.

Tuba oasis: Gregory, 404.

Arkansas.**Economic.**

Bauxite deposits: Fermor, 354; Wysor, 1267.

Eureka Springs-Harrison quadrangles: Purdue and Miser, 879.

Joplin district: Boyd, 98.

Physiographic.

Eureka Springs-Harrison quadrangles: Purdue and Miser, 879.

Northeastern Arkansas: Stephenson and Crider, 1047.

Stratigraphic.

Eocene: Berry, 63.

Eureka Springs-Harrison quadrangles: Purdue and Miser, 879.

Loess, Crowley's Ridge: Shimek, 985.

Northeastern Arkansas: Stephenson and Crider, 1047.

Paleontology.

Eocene: Berry, 63.

Loess, Crowley's Ridge: Shimek, 985.

Underground water.

Northeastern Arkansas: Stephenson and Crider, 1047.

Arkose deposits, types of: Barton, 43.

Arsenic.

United States: Hess, 455.

Arthropoda.

Earliest freshwater arthropods: Schuchert, 963.

Habitat and origin: Schuchert, 963.

Artesian waters and wells. *See* Underground water.

Asbestos.

Genesis: Taber, 1062.

United States: Diller, 302.

Veins of asbestiform minerals, origin: Taber, 1064.

Associations, meetings—Continued.

Geological Society of America, 28th meeting, Washington, District of Columbia: Berkey, 60.

New England intercollegiate, 14th: Barrell, 41.

Paleontological Society, seventh meeting, Washington, 1915: Bassler, 47.

Paleontological Society, Pacific coast section, sixth meeting: Packard, 822.

Asteroides.

Urasterella, New York: Hudson, 496.

Australites: Moore, 777.

Aves (birds).

Flight, beginnings: Lucas, 658; Shimer, 990.

Oligocene fossil eggs: Troxell, 1092.

Origin: Gregory, 409, 414.

Owl remains, Rancho La Brea, California: Miller, 762.

Pavo californicus, Rancho La Brea: Miller, 761.

Vulturid raptors, Rancho La Brea: Miller, 763.

Barite.

Appalachian States: Watson and Sharshall, 1165.

Georgia, Cartersville district: Vivian, 1140.

Nova Scotia, Cape Breton Island: Harrison, 430.

United States: Hill, 464.

Barytes. *See* Barite.

Bathyliths. *See* Intrusions.

Batrachia. *See* Amphibia.

Bauxite.

Arkansas: Fermor, 354; Wysor, 1267.

United States: Phalen, 844.

Beaches. *See also* Shore lines; Terraces.

New York: Fairchild, 345.

Nova Scotia, Cow Bay: McIntosh, 677.

Ontario, Lake Simcoe district: Johnston, 532.

Ottawa Valley: Johnston, 533.

Quebec, Ottawa Valley: Johnston, 533.

Bear River formation, Idaho: Mansfield and Roundy, 698.

Beckwith formation, Idaho: Mansfield and Roundy, 698.

Berea oil sand, Ohio, structure: Condit, 223.

Bibliography.

Arizona: Luttrell, 663.

Barite: Watson and Sharshall, 1165.

Bibliography—Continued.

Holmes, J. A., writings: Pratt, 862, 863.

Literature on geology: Condit, 225.

Loess: Cable, 154.

Maryland, Upper Cretaceous: Clark, 195.

Molybdenum: Horton, 488.

Morrison formation: Mook, 776.

New Jersey: Black, 81.

Oil shale: Winchester, 1247.

Osborn, H. F., writings: Ripley, 906.

Places: Dean and Eastman, 278.

Rogers, H. D., writings: Gregory, 408.

Washington, western: Weaver, 1176.

Willmott, A. B., writings: Coleman, 214.

Biography.

Comstock, T. B.: Ries, 905.

Davis, C. A.: Lane, 615.

Derby, O. A.: Branner, 102, 103.

Hayes, C. W.: White, 1201.

Holmes, J. A.: Pratt, 862, 863.

McGee, W. J.: Washington Ac. Sc., 1156.

Prosser, Charles Smith: Clarke, 203.

Rogers, H. D.: Gregory, 408.

Sutton, W. J.: Robertson, 911.

Willmott, A. B.: Coleman, 214.

Winchell, N. H.: Bain, 25; Upham, 1115.

Birds. *See* Aves.

Bismuth.

United States: Hess, 455.

Bituminous limestone.

Ohio, Greenfield: Napper, 786.

Bituminous sand.

Alberta, northern: Ellis, 337.

Bivalves. *See* Pelecypoda.

Black sand.

Pacific coast: Lang, 616.

Blowing wells. *See* Underground water.

Bog iron ore deposits, formation and distribution: Dake, 247.

Borax.

United States: Yale, 1269.

Borings.

Alberta: Huntley, 504.

southern: Slipper, 1006.

Drill cores, specific weight: Lane, 614.

Illinois, Birds quadrangle: Rich, 900.

Canton and Avon quadrangles: Savage, 243.

Vincennes quadrangle: Rich, 901.

Indiana: Wright, 1259.

Ontario: Knight, 586.

Temperature measurement in bore holes: Johnston and Adams, 527.

Texas, northern: Shaw, 980.

Botany, fossil. *See* Paleobotany.

Boulder batholith, Montana: Billingsley, 79.

Brachiopoda.

Atrypa reticularis: Thomas, 1075.

Brachiopoda—Continued.

Cambrian: Walcott, 1148.

Montana, Devonian: Haynes, 439.

Spirifer, Silurian, Maine: Williams, 1225.

Breccia. *See* Rock structures.

Brecciation, St. Louis limestone: Van Tuyl, 1122.

British Columbia.*General.*

Kootenay district: Schofield, 953.

Economic.

General: Robertson, 909.

Ainsworth district: Schofield, 954.

Bridge River area: Drysdale, 316.

Coal, Flathead area: MacKenzie, 678.

Graham Island: MacKenzie, 679.

Groundhog basin, Skeena district: Malloch, 690.

Nanaimo district, Vancouver Island: Clapp, 188.

Copper, Similkameen district: Keffer, 559.

Tyee deposit, Vancouver Island: Dolmage, 305.

Gold: Hepburn, 451.

Graham Island: MacKenzie, 679.

Highland Valley copper camp: Drysdale, 316.

Hydromagnesite, Atlin: Young, 1271.

Kootenay Lake, district east of: Bancroft, 33.

Northern interior: Camsell, 166.

Mineral production, 1915: Robertson, 910.

Molybdenite, Lost Creek: Drysdale, 315.

Silver-lead, Ainsworth district: Schofield, 954.

Telkwa Valley: MacKenzie, 680.

Physiographic.

General: Reinecke, 897.

Cirques, Skeena basin: Keyes, 569.

Graham Island: MacKenzie, 679.

Stratigraphic.

Ainsworth district: Schofield, 954.

Bridge River area: Drysdale, 316.

Cambrian, Mt. Bosworth: Burling, 136.

Copper Mountain, Similkameen district: Keffer, 559.

Flathead area: MacKenzie, 678.

Graham Island: MacKenzie, 679.

Highland Valley copper camp: Drysdale, 316.

Kootenay Lake, district east of: Bancroft, 33.

Nanaimo coal district, Vancouver Island: Clapp, 188.

Northern interior: Camsell, 166.

Rocky Mountains: Burling, 133.

Southwestern British Columbia: Tyrrell, 1104.

Telkwa Valley: MacKenzie, 680.

Paleontology.

Alberta fauna, Mt. Bosworth: Burling, 136.

British Columbia—Continued.**Paleontology—Continued.**

Fig. Pleistocene, Kootenay Valley:
Humphreys, 499.

Human remains, Savona: Drysdale,
316.

Leuciscus rosei, Miocene: Hussakof,
508.

Pædumias, Lower Cambrian: Burling,
135.

Mineralogy.

Hopeite, Salmo: Walker, 1148.

Hibbenite, Salmo: Phillips, 852.

Natrolite, Ice Valley: Phillips, 853.

Spencerite, Salmo: Phillips, 852.

Bremins.

United States: Phalen, 847.

Bucu quadrangle, Virginia: Hinds, 467.

Building stone. *See also* Granite; Lime-
stone; Sandstone; Stone.

General: Cullin, 245.

Arizona: Cullin, 245.

Kentucky, Bowling Green oolitic stone:
Crump, 238.

United States: Loughlin, 657.

Calcium carbonate: Day, 275.

Calcium carbonate, deposition, rôle of inor-
ganic agencies: Johnston and
Williamson, 528.

Calcium carbonate, the several forms:
Johnston *et al.*, 529.

Calcium carbonate deposition: Johnson,
522.

Calcium chloride.

United States: Phalen, 847.

Cadmium.

United States: Siebenthal, 997.

California.**Economic.**

Brine, Searles Lake: Hicks, 460.

Celestite, Lave, San Bernardino Coun-
ty: Mallery, 689.

Chromic iron ore: Diller, 301.

Gold, Butte County: Hubbard, 494.

Feather River region: McLennan,
685.

silver, copper, lead, and zinc in
1915; Yale, 1268.

Magnetite: Yale, 1270.

Bissell: Palmer, 834.

Manganese, Owl Head, San Bernardino
County: Mann, 692.

Mineral production, 1915: Bradley, 99.

Molybdenite, Ramona, San Diego
County: Calkins, 161.

Nickel, San Diego County: Calkins,
162.

Petroleum: English, 344.

San Joaquin Valley: Pack, 819.

Potash, Searles Lake: Hicks, 460.

Tin, San Diego County: Schaller, 949.

Tungsten, Kern County: Storms, 1056.

Randsburg district: Nevius, 788.

southern California: McDonald, 673.

California—Continued.**Dynamic and structural.**

Earthquakes: Wood, 1255.

1915: Palmer, 828.

registration: Davis, 266.

registration, October 1, 1915–March
31, 1916: Davis, 267.

Lassen Peak: Diller, 298.

eruption: Palmer, 829.

volcanic history: Diller, 299, 300.

Sedimentation, San Francisco Bay:
Sumner *et al.*, 1058.

Physiographic.

General: Wood, 1255.

Mohave Desert: MacDougal *et al.*, 674.

Sierra Nevada, Tertiary-Quaternary
orogenic history: Matthes, 716.

Salton Sea: MacDougal *et al.*, 674.

Yolo County, Cache Creek: Durst, 325.

Stratigraphic.

Chanac formation, Tejon Hills: Mer-
riam, 740.

Coalinga region: Nomland, 795.

Cretaceous, Santa Ana Mountains:
Packard, 820.

Cuyama Valley: English, 344.

Geological map: Smith, 1012.

Pliocene, Jacalitos Creek: Nomland,
796.

middle and northern California:
Martin, 704.

San Joaquin Valley oil fields: Pack,
819.

Southeastern California: Darton, 261.

Tehachapi region, Miocene: Buwalda,
152.

Tejon group: Dickerson, 294, 295.

San Diego County: Dickerson, 296.

Paleontology.

Bison antiquus: Chandler, 184.

Canis dirus, Rancho La Brea: Mat-
thew, 723.

Capromeryx, Rancho La Brea, Cali-
fornia: Chandler, 183.

Chanac mammalian fauna: Merriam,
740.

Coalinga region faunas: Nomland, 795.

Conifers, Rancho La Brea, California:
Knowlton, 592.

Corals, Cretaceous and Tertiary: Nom-
land, 794.

Cretaceous fauna, Santa Ana Moun-
tains: Packard, 820.

Deadmans Island, molluscan faunas:
Oldroyd, 806.

Fernando fauna, Los Angeles: Moody,
775.

Maestrinæ, Mesozoic and Cenozoic, Pa-
cific coast: Packard, 821.

Mammalia, Miocene, Tehachapi Pass:
Buwalda, 152.

Mollusca, Cretaceous and Tertiary.
San Jose region: Hall and Am-
brose, 421.

Owl remains, Rancho La Brea, Cali-
fornia: Miller, 762.

California—Continued.**Paleontology**—Continued.

Pavo californicus, Rancho La Brea : Miller, 761.

Pleistocene mammal fauna, Hawver cave : Stock, 1052.

Pliocene, Jacalitos Creek : Nomland, 796.

middle and northern California : Martin, 704.

Plihippus : Merriam, 738.

Rancho La Brea deposits : Matthew, 726.

Bison : Chandler, 185.

Rodeo Pleistocene fauna : Merriam *et al.*, 744.

Tejon fauna : Dickerson, 294, 295.

San Diego County : Dickerson, 296.

Tejon Hills, marine Tertiary faunas : Clark, 190.

Thalattosaurus, skull : Merriam and Camp, 742.

Vulturid raptors, Rancho La Brea : Miller, 763.

Petrology.

Lithophyse in obsidian from Little Lake : Wright, 1262.

Spherulites, Little Lake : Wright, 1262.

Mineralogy.

Alunite : Wherry, 1197.

Cassiterite, San Diego County : Schaller, 949.

Xanthophyllite, Crestmore : Eakle, 329.

Underground water.

San Joaquin Valley : Mendenhall *et al.*, 736.

Cambrian.**Stratigraphic.**

General : Walcott, 1143.

Alberta, Rocky Mountains : Burling, 133.

Arizona : Ransome, 881.

Warren district : Bonillas *et al.*, 90.

British Columbia, Mt. Bosworth : Burling, 136.

Colorado, Colorado Springs quadrangle : Finlay, 357.

Minnesota, Minneapolis-St. Paul district : Sardeson, 937.

Montana, Helena : Walcott, 1146.

Three Forks region : Haynes, 440.

New Mexico, Luna County : Darton, 258.

Silver City quadrangle : Paige, 824.

New York, Lake Pleasant quadrangle : Miller, 766.

Pennsylvania, Chester County, Doe Run-Avondale region : Bliss and Jonas, 88.

Tennessee, Johnson County : Jenkins, 514.

Texas : Udden *et al.*, 1107.

Utah, Promontory district : Butler and Helkes, 146.

Vermont : Dale, 248.

Cambrian—Continued.**Stratigraphic**—Continued.

West Virginia, Jefferson, Berkeley and Morgan counties : Grimsley, 416.

Wisconsin : Weldman and Schultz, 1181.

Sparta shale : Shipton, 994.

Paleontology.

General : Walcott, 1143.

British Columbia, Mt. Bosworth : Burling, 136.

Paedeumias : Burling, 135.

Canada, eastern : Matthew, 717.

Montana, Helena : Walcott, 1146.

Trilobites : Walcott, 1144, 1145, 1147.

Canada (general). *See also names of provinces.*

General : Termier, 1069, 1070.

Arctic regions : O'Neill, 808.

Bibliography, 1914 : Malcolm, 688.

Report on borings : Ingall, 510.

Survey report, 1915 : McConnell, 668.

Economic.

Coal : Mallhot, 687.

Coal basins : Pruvost, 875.

Feldspar : De Schmid, 287.

Mineral production, 1914 : McLeish, 684.

Pent : Anrep, 13.

Physiographic.

Plains, formation of : Dowling, 311.

Plains of northwestern Canada : Dowling, 312.

Stratigraphic.

General : Mather, 710.

Arctic regions : O'Neill, 808.

Paleontology.

General : Mather, 710.

Cambrian faunas, eastern Canada : Matthew, 717.

Report of stratigraphical paleontologist : Kindle, 575.

Report of vertebrate paleontologist : Lambe, 611.

Report on paleobotany : Wilson, 1245.

Type fossils in the Peter Redpath Museum : Ardley, 15.

Mineralogy.

Report on mineralogy : Johnston, 530.

Canal Zone. *See Panama.*

Canton quadrangle, New York : Martin, 707.

Carboniferous.**Stratigraphic.**

Berea formation : Verwiebe, 1137.

Brecciation, St. Louis limestone : Van Tuyl, 1122.

Chester group : Ulrich, 1112 ; Weller, 1185.

Chouteau limestone, terranol affinities : Keyes, 568.

Dunkard series : Stauffer, 1039.

Maxville limestone, Ohio : Lamb, 609.

Red beds, lithogenesis and stratigraphy, southeastern Wyoming : Knight, 587.

Carboniferous—Continued.**Stratigraphic—Continued.**

- Ste. Genevieve, southeastern Iowa:
Weller and Van Tuyl, 1187.
- Alaska, Chisana-White River district:
Capps, 170.
- Alberta, Rocky Mountains: Burling,
133.
- Arizona: Ransome, 881.
Warren district: Bonillas *et al.*, 90.
- Arkansas, Eureka Springs-Harrison
quadrangles: Purdue and
Miser, 879.
- British Columbia, Flathead area: Mac-
Kenzie, 878.
- Colorado, Colorado Springs quadrangle:
Finlay, 357.
- Illinois: Young, 1272.
Birds quadrangle: Rich, 900.
district VI: Cady, 156.
Springfield quadrangle: Savage, 940.
Vincennes quadrangle: Rich, 901.
- Indiana, Greene County: Van Gorder,
1117.
- Iowa, southeastern, St. Genevieve:
Weller and Van Tuyl, 1187.
southwestern: Smith, 1009, 1010.
- Kentucky, west central, Mississippian
section: Butts, 150.
- Montana, Cascade County: Barnett, 38.
Three Forks region: Haynes, 440.
- New Mexico, Luna County: Darton,
258.
- Rio Grande Valley, red beds: Case, 178.
Silver City quadrangle: Paige, 824.
- Ohio, Dunkard series: Stauffer, 1039.
Flint Ridge: Mark, 703.
Maxville limestone: Lamb, 609.
Woodsfield quadrangle: Condit, 223.
- Oklahoma, Billings area: Fath, 350.
Foraker quadrangle: Heald, 441.
- Tennessee, coal fields: Glenn, 390;
Nelson, 787.
- Texas: Udden *et al.*, 1107.
- Utah, Castle Valley: Lupton, 660.
- Promontory district: Butler and
Helkes, 146.
- Virginia, Buchanan quadrangle: Hinds, 467.
Clintwood quadrangle: Hinds, 467.
- West Virginia: Reger, 892.
Jefferson, Berkeley, and Morgan
counties: Grimsley, 416.
Mercer County: Krebs and Teets,
602.
Raleigh County: Krebs and Teets,
602.
Summers County: Krebs and Teets,
602.
- Wyoming, central: Hares, 424.
Embar formation: Branson, 104.
Embar and Chugwater formations:
Condit, 224.
North Laramie Mountains: Spencer,
1028.
red beds: Knight, 587.
Salt River Range: Mansfield, 694.

Carboniferous—Continued.**Palaeontology.**

- Coal Measures Amphibia: Moodie, 771.
Iowa, southwestern: Smith, 1009,
1010.
Kansas: Beede, 56.
New Mexico, Sphenacodon: Williston,
1238.
Oklahoma: Beede, 56.
Palaeoniscid fish, Permian, South Da-
kota: Hussakof, 507.
Permian fauna: Case, 177.
Permian Vertebrata: Cope and Mat-
thew, 229.
osteology: Williston, 1235.
Ste. Genevieve fauna, Monroe County,
Illinois: Weller, 1184.
Tetrapoda, Permian: Williston, 1236.
West Virginia, Lewis and Gilmer coun-
ties: Price, 865.
West Virginia, Raleigh County: Price,
866.
Wyoming, Embar formation: Branson,
104.

Cartography. See Maps.

Castle Valley, Utah: Lupton, 660.

Catahoula sandstone: Matson, 714.

Caves.

- Arizona, Bisbee, Copper Queen Cave:
Beasley, 53.
Ohio, central, Reames Cave: Illis, 465.

Celestite.

- California, San Bernardino County,
Lavic Station: Mallory, 689.

Cement and cement materials.

- Arizona: Culin, 243.
United States: Burchard, 132.

Central America. *See* Costa Rica; Guate-
-mala, etc.

Cephalopoda. See also Mollusca.

- Iowa, Niagaran: Thomas, 1074.
Niagaran, Iowa: Thomas, 1074.
Pseudorthoceras knoxense, apical end:
Girty, 389.

Cetacea. See Mammalia.**Changes of level. See also Beaches; Shore
lines; Terraces.**

- Coastal dunes as evidence of rise of
sea level: Sanford, 936.
Florida: Vaughan and Shaw, 1136.
Great Lake region, terrestrial stabili-
-ty: Spencer, 1031.
Maine, subsidence of coast: Davis, 265.
Tangential movements, Great Lakes
region: Decker, 280.

Chapman sandstone, Maine: Williams, 1226.

Chapman sandstone fauna: Williams, 1226.

Chalcocite, etch patterns: Tolman, 1081.

Chemical analyses. *See* list, p. 149.

Chert.

Origin: Cox *et al.*, 233.

Chisana-White River district, Alaska:
Capps, 170.

Chromic iron ore.

California: Diller, 301.

Citronelle formation: Matson, 713.

Clay. *See also* Fire clay.*General.*

Origin: Davis, 268.

Plasticity: Davis, 268.

Appalachian States, southern: Watkins, 1158.

New York, Albany slip clay: Jones, 537.

Ohio, Cleveland area: Van Horn, 1119.

Pennsylvania, fire clay: Morganroth, 779.

Clay slips, origin: Wilson, 1244.

Climate, geologic. *See* Paleoclimatology.

Clintwood quadrangle, Virginia: Hinds, 467.

Coal. *See also* Anthracite; Lignite.

General: Cosgrove, 231; Stevenson, 1048.

Accumulation of vegetable matter: Savage, 941.

Analyses: Campbell and Clark, 164; Pope, 855.

Clay slips, origin: Wilson, 1244.

Formation, mode of: Stevenson, 1049.

Structure: Tonge, 1087.

Structure and formation: Jeffrey, 512.

Alaska: U. S. Dept. Int., 1114.

Alberta: Dowling, 307.

Drumbeller field: Macaulay, 665.

Arizona: Rubel, 928.

British Columbia, Flathead area: MacKenzie, 678.

Graham Island: MacKenzie, 679.

Skeena district, Groundhog basin: Malloch, 690.

Vancouver Island: Clapp, 188.

Canada: Mailhot, 687; Pruvost, 875.

Colorado, Colorado Springs quadrangle: Finlay, 357.

Illinois: Young, 1272.

district VI: Cady, 156.

Springfield quadrangle: Savage, 940.

Montana, eastern: Rowe and Wilson, 925.

Stillwater basin: Calvert, 163.

Teton County: Stebinger, 1041.

Newfoundland: McGrath, 676.

Pennsylvania, anthracite fields, map: Alder & Co., 5.

Saskatchewan: Dowling, 307.

Wood Mountain-Willowbunch area: Rose, 922.

Tennessee, field north of Tennessee

Central Railroad: Glenn, 390.

field south of Tennessee Central Railroad: Nelson, 787.

United States: Lesh, 684.

Utah: Watts, 1166, 1167.

Castle Valley: Lupton, 660.

Virginia, Bucu quadrangle: Hinds, 467.

Coal—Continued.

Clintwood quadrangle: Hinds, 467.

Western Interior coal measures: Van Tuyl, 1124.

West Virginia, Jefferson, Berkeley, and Morgan counties: Grimsley, 416.

Lewis and Gilmer counties: Rege, 892.

Meadow Branch field: Grimsley, 416.

Mercer County: Krebs and Teets, 602.

Raleigh County, Krebs and Teets, 602.

Summers County: Krebs and Teets, 602.

Yukon: Cairnes, 157.

Coal measures. *See* Carboniferous.**Cobalt.**

United States: Hess, 454.

Colloidal migration in ore deposits: Crandall and Menaul, 191.

Colorado.*Economic.*

Colorado Springs quadrangle: Finlay, 357.

Gilpin County: Bastin and Hill, 51.

Mineral production, 1915: Henderson, 449.

Molybdenum: Fleck, 359.

Oil shales, northwestern Colorado: De Beque, 279; Winchester, 1247.

Pitchblende, Gilpin County: Alsdorf, 11; Bastin, 50.

Tungsten: Fleck, 359.

Boulder district: Kirk, 581; Leslie, 635; Wolf and Barbour, 1252.

Uranium: Fleck, 359.

Uraninite: Pearce, 841.

Vanadium: Fleck, 359.

Wolframite and scheelite, Leadville: Fitch and Loughlin, 358.

Dynamic and structural.

Stylolites in quartzite, Breckenridge: Tarr, 1067.

Physiographic.

Colorado Springs quadrangle: Finlay, 357.

Gunnison River, Grand Canyon: Atwood and Mather, 22.

San Juan Mountains, geographic history: Atwood and Mather, 23.

Stratigraphic.

Colorado Springs quadrangle: Finlay, 357.

Florissant shales: Cockerell, 212.

Florissant lake beds: Knowlton, 598.

Fox Hills sandstone: Knowlton, 597.

Golden, sections: Ehnborn, 334.

Morrison formation: Mook, 776.

Paleontology.

Algæ of petroleum-yielding shales of Green River formation: Davis, 263, 264.

Cretaceous plants, southwestern Colorado: Cockerell, 207.

Colorado—Continued.**Paleontology—Continued.**

- Florissant fossils: Cockerell, 212.
- Insecta, Elateridae: Wickham, 1221.
- Coleoptera: Wickham, 1220.
- Glossina (tsetse-fly), Florissant: Cockerell: 210.
- plants: Knowlton, 598.
- Fox Hills flora: Knowlton, 597.
- Insecta: Cockerell, 211.
- Titanotheres, Oligocene: Osborn, 814.

Petrology.

- Colorado Springs quadrangle: Finlay, 357.

- Gilpin County: Bastin and Hill, 51.

Mineralogy.

- Cancrinite, sulphatic: Larsen and Steiger, 617.
- Uraninite: Pearce, 841.
- Wagon Wheel Gap: Larsen and Wells, 618.
- Wolframite and scheelite, Leadville: Fitch and Loughlin, 358.

- Colorado Springs folio (no. 203): Finlay, 357.

- Columbia River gorge, geologic history: Williams, 1228.

Conglomerates.

- Barite, Nebraska: Burnett, 139.
- Menillite, organic structure: Herrera, 452.

Conglomerates.

- Intraformational conglomerates, origin and classification: Field, 356.
- Louisiana, Shreveport, intraformational conglomerate and breccia: Emerson, 341.

Congresses. See Associations.

- Connate water in oil and gas sands: Johnson, 523; Shaw, 979.

Contact phenomena.

- Garnet zones: Kemp, 562.
- Ontario, Long Lake mine: Uglow, 1109.
- Ore on limestone side of garnet zones: Umpleby, 1113.

Connecticut.**Economic.**

- Feldspar: Watts, 1168.

Underground water.

- Hartford, Stamford, Willimantic, and Saybrook areas: Gregory and Ellis, 407.

- Waterbury area: Ellis, 336.

Copper.

- General: Weed, 1178.

- Chalcocite, etch patterns: Tolman, 1081.

- Intergrowth of bornite and chalcocite: Berman, 600.

Copper—Continued.**General—Continued.**

- Surficial indications: De Kalb, 284; Probert, 868.

- Alaska: Brooks, 119.

- Arizona: Helkes, 443; Joseph, 543.

- Clifton-Morenci district: Reber, 889.

- British Columbia, Highland Valley copper camp: Drysdale, 316.

- Similkameen district: Keffer, 559.

- Vancouver Island, Tyee deposit: Dolmage, 305.

- California and Oregon: Yale, 1268.

- Central States: Dunlop and Butler, 323.

- Coppermine country: Tyrrell, 1140.

- Cuba, Pinar del Rio region: Vall, 1116.

- Colorado: Henderson, 449.

- Eastern States: Hill, 462.

- Idaho: Gerry, 381.

- Maryland: Overbeck, 818.

- Montana: Helkes, 441.

- Butte: Thompson, 1077.

- Nevada: Helkes, 445.

- New Mexico: Henderson, 448; Turner, 1097.

- Burro Mountains: Somers, 1023.

- Grant County, Pinos Altos district: Blood, 89.

- Santa Rita: MacDonald and Enzian, 672.

- Northwest Territory: Tyrrell, 1100.

- Ontario, Thessalon area: Knight, 585.

- Oregon, Curry County: Butler and Mitchell, 147.

- Quebec, Wolf County, Weedon: Adams, 3.

- Santo Domingo, San Cristobal: Donnelly, 306.

- South Dakota: Henderson, 447.

- Texas: Henderson, 448.

- United States: Butler, 145.

- Utah: Helkes, 442.

- Bingham Canyon: Atwood, 21; Beeson, 57.

- Washington: Gerry, 381.

- Wyoming: Henderson, 447.

Corals. See Anthozoa.**Coral reefs and islands.**

- General: Davis, 270; Vaughan, 1132.

- Bahamas: Vaughan, 1133.

- Barrier reefs, origin: Vaughan, 1131.

- Extinguished and resurgent reefs: Davis, 272.

- Florida: Vaughan, 1133; Vaughan and Shaw, 1136.

- Origin: Daly, 252; Davis, 273.

- Submarine solution of limestone: Mayer, 729.

Costa Rica.*Dynamic and structural.*

Earthquake, February 27, 1916: Tristán, 1089.

Cretaceous.*General.*

Bear River formation, Idaho: Mansfield and Roundy, 698.

Beckwith formation, Idaho: Mansfield and Roundy, 698.

Correlation: Schuchert, 959.
upper Cretaceous, Atlantic and Gulf Coastal. Plain: Stephenson, 1045.

Dakota sand: Huntley, 504.

Fox Hills sandstone: Knowlton, 597.

Laramie formation: Bowen, 93.

Morrison formation: Mook, 776.

age: Knowlton, 593.

Stratigraphy.

Alberta: Dowling, 309; Sinclair, 1000.

Crowsnest Pass: McLearn, 683.

oil fields: Dowling, 308.

southern: Slipper, 1006.

southwestern: Stewart, 1051.

Arizona, Warren district: Bonillas *et al.*, 90.

Arkansas, northeastern: Stephenson and Crider, 1047.

British Columbia, Flathead area: MacKenzie, 678.

Grabam Island: MacKenzie, 679.

Vancouver Island: Clapp, 188.

Atlantic and Gulf coastal plain, correlation: Stephenson, 1045.

Atlantic coast, Middle: Clark *et al.*, 108.

California, Cuyama Valley: English, 344.

Santa Ana Mountains: Packard, 820.

Colorado, Colorado Springs quadrangle: Finlay, 357.

District of Columbia, Potomac formation: Sinnott and Bartlett, 1004.

Georgia, Coastal Plain: Brantley, 105.

Idaho, southeastern: Mansfield and Roundy, 698, 699.

Louisiana, Caddo oil and gas field: Matson, 711.

Manitoba, Pembina Mountain: MacLean, 682.

Maryland: Clark, 195.

Mexico, eastern: DeGolyer, 282; Dumble, 319.

Furber field: DeGolyer, 281.

Hidalgo, Tulancingo: Galvez, 379.

Puebla, Tehuacan: Böse, 91.

Montana, Boulder batholith: Billingsley, 79.

Cascade County: Barnett, 38.

eastern: Rowe and Wilson, 925.

north-central: Stebinger, 1042.

Stillwater basin: Calvert, 163.

Teton County: Stebinger, 1041.

Three Forks region: Haynes, 440.

Cretaceous—Continued.*Stratigraphy—Continued.*

Mississippi: Logan, 650.

Vicksburg-Jackson area: Hopkins, 483.

New Mexico, Luna County: Darton, 258.

San Juan County: Bauer, 52; Knowlton, 600.

Silver City quadrangle: Paige, 824.

North Dakota: Leonard, 631.

Oregon, Curry County: Butler and Mitchell, 147.

Saskatchewan, Wood Mountain-Willow bunch area: Rose, 922.

South Dakota, northwestern: Winchester *et al.*, 1248.

Tennessee: Berry, 74.

Texas: Udden *et al.*, 1107; Dumble, 319.

Dallas region: Matson, 712.

Lasalle and McMullen counties: Deussen and Dole, 289.

Utah, Castle Valley: Lupton, 660.

Washington, western: Weaver, 1176.

Wyoming, Bighorn basin: Lupton, 659; 661.

central: Hares, 424.

Grass Creek field: Hintze, 469.

Hanna Basin: Bowen, 93.

Little Buffalo Basin field: Hintze, 468.

North Laramie Mountains: Spencer, 1028.

Powder River Basin: Wegemann, 1180.

Wind River basin: Ziegler, 1275.

Paleontology.

California, San Jose region, Mollusca: Hall and Ambrose, 421.

Santa Ana Mountains: Packard, 820.

Colorado, southwestern, plants: Cockrell, 207.

Corals, California and Oregon: Nomland, 794.

District of Columbia, Potomac formation: Sinnott and Bartlett, 1004.

Fox Hill flora: Knowlton, 597.

Maryland, Upper Cretaceous: Clark *et al.*, 196.

Micrabacids, Upper Cretaceous: Stephenson, 1046.

Morrison fauna: Mook, 776.

New Mexico, San Juan County, flora of Fruitland and Kirtland formations: Knowlton, 600.

Invertebrata: Stanton, 1037.

Vertebrata: Gilmore, 387.

Tennessee, Plants: Berry, 74.

Grinoida. See also Echinodermata.

Atactocrinus, Richmond, Illinois: Weller, 1183.

Basal plate evolution in monocyclic Camerata: Wilson, 1241.

Iowa, Monticello: Thomas, 1073.

Crustacea.

- Acanthotelson stimpsoni, uropods,
Mazon Creek: Cockerell, 208.
- Branchioplax, Port Townsend, Wash-
ington: Rathbun, 882.
- Syncaurida: Cockerell, 208.

Cryolite.

- Greenland, Ivigtut: Bernard, 62;
Burchard, 131.

Cryptogams. See Paleobotany.

Crystallography.

- Crystal forces: Wright, 1261.
- Crystal zones, plotting on paper.
Blake, 86.
- Graduated sphere for crystal optics:
Warren, 1154.
- Moscovite in Cockeysville marble,
optical properties: Clark and
Hunt, 194.
- Natrolite, British Columbia: Phillips,
853.
- Textbook: Dana, 257.
- Veins of asbestiform minerals, origin:
Taber, 1064.

Crystals, growth of: Taber, 1061.

Cuba. See also West Indies.

Economic.

- Copper, Pinar del Rio region: Vall,
1116.
- Iron: Little, 645.
- Dalquiri district: Kemp, 564; Lind-
gren and Ross, 644.
- Dalquiri and Firmeza deposits:
Singewald and Miller, 1001.
- Firmeza district, Oriente Province:
Roesler, 915.
- Mayari district: Kemp, 563; Leith
and Mead, 629.
- Oriente Province: Singewald and
Miller, 1002.

Physiographic.

- Guantanamo Bay: Meinzer, 734.

Stratigraphic.

- Dalquiri district: Kemp, 564; Lind-
gren and Ross, 644.
- Firmeza district, Oriente Province:
Roesler, 915.
- Guantanamo Bay: Meinzer, 734.
- Mayari district: Kemp, 563.

Petrology.

- Dalquiri: Lindgren and Ross, 644.
- Firmeza district, Oriente Province:
Roesler, 915.
- Mayari district: Kemp, 563.

Denudation. See Erosion.

Deposition. See Sedimentation.

Deposition of ores. See Ore deposits,
origin.

Detroit River series, age: Stauffer, 1038.

Mohave Desert: MacDougal *et al.*, 674.

Devonian.

Stratigraphy.

- Alaska, Chisana-White River district:
Capps, 170.
- Ruby-Kuskokwim region: Mertle and
Harrington, 751.
- Alberta, Rocky Mountains: Burling,
133.
- Arizona: Ransome, 881.
- Warren district: Bonillas *et al.*, 90.
- Arkansas, Eureka Springs-Harrison
quadrangles: Purdue and Miser,
879.
- British Columbia, Flathead area: Mac-
Kenzie, 678.
- Chapman sandstone, Maine: Williams,
1226.
- Correlation, Ohio: Stauffer, 1040.
- Detroit River series, age: Stauffer,
1038.
- Ellesmere Land, Anthozoa: Loewe, 649.
- Indiana, Jefferson County: Culbertson,
239.
- Missouri, southeastern: Weller, 1186.
- Montana: Haynes, 439.
- Three Forks region: Haynes, 440.
- New Mexico, Luna County: Darton,
258.
- Silver City quadrangle: Paige, 824.
- New York, central: Smith, 1008.
- Northwest Territory, MacKenzie River
valley: Kindle, 579.
- Ohio, northern: Stauffer, 1040.
- Olenitangy shale: Stauffer, 1040.
- Ontario: Knight, 586; Stauffer, 1040.
- West Virginia, Jefferson, Berkeley, and
Morgan counties: Grimsley, 416.
- Wisconsin: Weldman and Schultz,
1181.

Paleontology.

- Chapman sandstone fauna: Williams,
1226.
- Northwest Territory, MacKenzie River
valley: Kindle, 579.
- Ohio, northern: Stauffer, 1040.

Diseased bones, Mesozoic: Moodle, 773.

111-11

Distribution. *See* Geographic distribution.

Dolomite.

Origin: Loughlin, 652; Steidtmann, 1043; Van Tuyl, 1123, 1127, 1128.

mottled limestones: Van Tuyl, 1120.
Tennessee, Johnson County: Jenkins, 514.

Dolomitization: Steidtmann, 1043.

Drainage changes.

Illinois, Illinois Valley: Sauer, 938.

New York, Adirondacks: Ailing, 10.

North Dakota, western: Leonard, 632.

West Virginia, Jefferson, Berkeley, and Morgan counties: Grimsley, 416.

Drift deposits. *See also* Glacial geology.

Gumbo, Iowa: Kay, 554.

Dynamic and structural (general). *For regional, see the various States. See also list of subject headings on p. 99.*

General: Fenneman, 352.

Breccia in St. Louis limestone, origin: Morse, 781.

Calcium carbonate: Merwin, 752.

Calcium carbonate deposition: Johnson, 522, 526.

rôle of inorganic agencies: Johnston and Williamson, 528.

Clay slips, origin: Wilson, 1244.

Continental deposition: Keyes, 572.

Corrosive action of brines, Manitoba: Wallace, 1150.

Cross-fiber veins, origin: Taber, 1064.

Desert regolith: Keyes, 572.

Dolomitization: Steidtmann, 1043.

Great Lake region, terrestrial stability: Spencer, 1031.

Homocline and monocline: Daly, 253.

Hydrothermal alteration: Stephenson, 1044.

Intraformational breccias, origin and classification: Field, 356.

Linear force of growing crystals: Becker and Day, 55.

Ohio, Cincinnati region: Fenneman, 352.

Phosphorus, geologic rôle: Blackwelder, 83, 84.

Pit and mound structures: Kindle, 580.

Red beds, origin: Tomlinson, 1086.

Ripple marks: Udden, 1106.

Submarine solution of limestone: Mayer, 729.

Subsidence resulting from mining: Young, 1273.

Tangential movements, Great Lakes region: Decker, 280.

Veins of asbestiform minerals, origin: Taber, 1064.

Earth, genesis of. *See also* Dynamic and structural (general).

General: Chamberlin, 180, 181.

Earth, interior.

General: Day, 277.

Earth movements. *See* Landslides.

Earthquakes. *See also* Seismology.

Appalachians, southern, February 21, 1916; Taber, 1063.

February 10, 1914: Klotz, 582.

California: Wood, 1255.

1915: Palmer, 828.

registration, 1915: Davis, 266.

registration, 1915-1916: Davis, 267.

Costa Rica, February 27, 1916: Tristán, 1089.

Mexico, seismic movements, 1911: Mex. Inst. Geol., 755.

seismic movements, 1912: Mexico, Inst. Geol., 757.

Volcano Lake: Anon, 1280.

Nevada, Pleasant Valley: Berry, 77.

New England, 1755: Brasch, 106.

Echinodermata. *See* Asteroidea; Blastoides; Crinoides; Cystoides; Echinoides.

Echinoides.

Buda limestone: Whitney, 1209.

Economic (general). *For regional see under the various States. See also* Ore deposits origin, and the particular products.

Connate water in oil and gas sands: Shaw, 979.

Iron ore exploration, geology in: Leith, 628.

Metallogenetic epochs in pre-Cambrian of Ontario: Miller and Knight, 764.

Minerals, opaque, microscopical determination: Murdoch, 784.

Ore shoots: Garrison, 380.

Ores of copper, lead, gold, and silver: Fulton, 377.

Persistence of ore in depth: Rickard, 903.

Review for 1915: Knopf, 588.

Educational. *See also* Textbooks.

Syllabus of lectures on field geology: Keyes, 574.

Eggs, fossil.

Nebraska, Oligocene: Troxell, 1092.

Elevation and subsidence. *See* Changes of level.

Ellipsoidal lavas, Glacier National Park, Montana: Burling, 134.

Enrichment.

Copper, Utah, Bingham Canyon: Atwood, 21.

Montana, Butte district: Atwood, 21.

Eocene. *See* Tertiary.

Eolian action. *See* Windwork.

Eruptive rocks. *See* Igneous and volcanic rocks.

Essays. *See* Addresses.

Eureka Springs-Harrison folio (no. 202): Purdue and Miser, 879.

Eurypterida.

Habitat: O'Connell, 802; Ruedemann, 931.

Evolution.

General: Parbour, 36; Cockerell, 209; Osborn, 813.

Air-breathing Vertebrata, origin: Barrell, 40.

Arthropoda, habitat and origin: Schuchert, 963.

Drama: Cockerell, 209.

Primates: Gregory, 411.

Rise of air-breathing vertebrates: Barrell, 40.

Rôle of service: Shimer, 989.

Evolution of the earth: Chamberlin, 181.

Excursions.

Massachusetts, Williams College, vicinity: Cleland, 205.

New England Intercollegiate, 14th: Barrell, 41.

Experimental investigations.

Copper sulphide enrichment, reactions: Zies *et al.*, 1276.

Crystals, growth of: Taber, 1061.

Hydrothermal alteration: Stephenson, 1044.

Secondary enrichment, mercury deposits: Broderick, 110.

Sulphide ore enrichment, laboratory studies: Young and Moore, 1274.

Explosion craters: Darton, 260.

Faulting.

Arkansas, Eureka Springs-Harrison quadrangles: Purdue and Miser, 879.

Clay slips, origin: Wilson, 1244.

Iowa: Keyes, 566, 570.

Kentucky, north central: Miller, 759.

Michigan, Keweenaw region: Lane, 613.

Montana, Lombard overthrust: Haynes, 440.

New York, Lake Pleasant quadrangle: Miller, 768.

Ore deposition, relation to faulting: Spurr, 1035.

Pennsylvania, Hollidaysburg quadrangle: Butts, 151.

Utah, Tintic district: Loughlin, 654.

Feldspar.

General: De Schmid, 287.

Appalachian region: Watts, 1168.

Canada: De Schmid, 287.

Georgia, Macon district: Maynard, 730.

New England: Watts, 1168.

Ontario, Kingston area: Baker, 29.

United States: Katz, 547.

Field work.

Florida—Continued.**General—Continued.**

Report of State geologist: Sellards, 965.

Economic.

Map, phosphate deposits, etc.: Fla. G. S., 364.

Mineral industries, 1915: Sellards, 966.

Peat deposits: Forsalith, 372.

Physiographic.

Dead Lake of Chipola River: Sellards, 972.

Stratigraphic.

Alum Bluff formation: Berry, 65.

Citronelle formation: Matson, 713.

Choctawhatchee marl, Walton County: Mansfield, 701.

Ocala limestone, age: Cooke, 227.

Tertiary: Sellards, 967.

Vero: Sellards, 968, 969.

Palaeontology.

Alum Bluff flora: Berry, 65.

Arcas: Sheldon, 983.

Choctawhatchee marl, Walton County: Mansfield, 701.

Human remains and associated fossils, Pleistocene: Sellards, 968, 969, 971.

Testudo hayi: Sellards, 970.

Tomistoma americana: Sellards, 970.

Vertebrata: Hay, 435; Sellards, 967.

Mineralogy.

Meteorite, Lake Okechobee: Merrill, 750.

Fluorspar.

United States: Burchard, 131.

Folding.

Montana, Lombard overthrust: Haynes, 440.

New York Adirondack region: Miller, 767.

Foraker quadrangle, Oklahoma: Heald, 441.

Foraminifera.

Cuba, Orbitoides: Kemp, 563.

Fossils. *See* Paleontology.

Fox Hills sandstone: Knowlton, 597.

Fulgurites.

Wisconsin, Sparta: Shipton, 993.

Galena-Elizabeth folio (no. 200): Shaw and Trowbridge, 982.

Garnets.

Arizona and Utah, Navajo Reservation: Gregory, 406.

Gas. *See* Natural gas.

Geochemistry—Continued.

- Analyses, Mexico: Mexico, Inst. Geol., 756.
 Calcium carbonate, the several forms: Johnston *et al.*, 529.
 Copper sulphide enrichment, reactions: Zies *et al.*, 1276.
 Oil field waters: Rogers, 919.
 Oxidation of manganese solutions: Lenher, 630.
 Petroleum: Bacon and Hamor, 24.
 Potash, extraction from wyomingite: Wells, 1188.
 Sericite a low temperature hydrothermal mineral: Rogers, 916.

Geodes.

- Keokuk beds: Van Tuyl, 1126.
 Origin: Van Tuyl, 1126.

Geogenesis: Chamberlin, 180. *See also* Earth, genesis of.

Geographic distribution.

- General: Barbour, 36.
 Isthmus of Panama and animal life of North and South America: Scott, 964.

Geologic climate. *See* Paleoclimatology.

Geologic formations described. *See* *List*, p. 151.

Geologic history. *See also* Paleoclimatology; Paleogeography.

- Alaska, Chisana-White River district: Capps, 170.
 Triassic: Martin, 705.
 Yukon-Koyukuk region: Eakin, 327.
 Alexandrian epoch, Mississippi Valley: Savage, 944.
 Arizona, Warren district: Bonillas *et al.*, 90.
 Arkansas, Eureka Springs-Harrison quadrangles: Purdue and Miser, 879.
 northeastern: Stephenson and Crider, 1047.
 British Columbia, southwestern: Tyrrell, 1104.
 California, Cuyama Valley: English, 344.
 Lassen Peak: Diller, 300.
 Tejon group: Dickerson, 294.
 Yolo County, Cache Creek area: Durst, 325.
 Colorado, Colorado Springs quadrangle: Finlay, 357.
 Gilpin County: Alsdorf, 11.
 Cuba, Oriente Province, Firmeza district: Roesler, 915.
 Dakota sand: Huntley, 504.
 Florida, east coast: Sellards, 968, 969.

Geologic history—Continued.

- Kentucky, north central: Miller, 759.
 Maryland, Upper Cretaceous: Clark, 195.
 Mexico, eastern: Dumble, 319.
 Hidalgo, Tulancingo: Gálvez, 379.
 Michigan, Upper Peninsula: Lane, 613.
 Minnesota, Minneapolis-St. Paul district: Sardeson, 937.
 Montana, Boulder batholith: Billingsley, 79.
 Butte district: Atwood, 21.
 eastern: Rowe and Willson, 925.
 New England: Anon., 1277.
 New Mexico, Luna County: Darton, 258.
 Silver City quadrangle: Paige, 824.
 New York, Lake Pleasant quadrangle: Miller, 766.
 Saratoga quadrangle, glacial: Stoller, 1053.
 Ohio, Cincinnati region: Fenneman, 852.
 Oregon, Columbia River gorge region: Williams, 1228.
 Curry County: Butler and Mitchell, 147.
 Pennsylvania, Chester County, Doe Run-Avondale region: Bliss and Jonas, 88.
 Porto Rico: Reeds, 890.
 Quebec, Beauce County: Tyrrell, 1102.
 Lake St. John district: Dresser, 313.
 Saskatchewan, Wood Mountain-Willowbunch area: Rose, 922.
 Tennessee, Johnson County: Jenkins, 514.
 Texas: Dumble, 319; Udden *et al.*, 1107.
 Carboniferous: Baker, 28.
 Utah, Bingham Canyon: Atwood, 21.
 Tintic district: Crane, 236.
 Washington, Skykomish basin: Smith, 1022.
 western: Weaver, 1176.
 Wisconsin: Weldman and Schultz, 1181.
 Wyoming, Fremont County, Copper Mountain district: Trumbull, 1094.
Geologic maps.
 Alabama, marble deposits: Prouty, 873.
 Alaska, antimony deposits: Brooks, 117.
 Chisana-White River district: Capps, 170.
 Cosna-Nowitna region: Eakin, 328.
 Ketchikan district, mineral deposits: 188.

Geologic maps—Continued.

- Arizona, Carrizo Mountain: Emery, 342.
 Jerome district: Provot, 874.
 Mohave County: Schrader, 957.
 Mohave region: Schrader, 958.
 Navajo country: Gregory, 405.
 Mule Mountains: Bonillas *et al.*, 90.
 Warren district: Bonillas *et al.*, 90.
 Arkansas, Eureka Springs-Harrison quadrangles: Purdue and Miser, 879.
 northeastern: Stephenson and Cridder, 1047.
 British Columbia, Bridge River area: Drysdale, 316.
 Flathead area: MacKenzie, 678.
 Highland Valley copper camp: Drysdale, 316.
 northern interior: Camsell, 166.
 California: Smith, 1012.
 Cuyama Valley: English, 344.
 Mount Diablo region (south): Dickerson, 294.
 Santa Ana Mountains: Packard, 820.
 Colorado, Colorado Springs, quadrangle: Finlay, 537.
 Cuba, Oriente Province, Firmeza district: Roesler, 915.
 Florida, phosphate deposits: Fla. G. S., 364.
 Georgia, Coastal Plain: Brantley, 105.
 Green River formation, Colorado, Utah and Wyoming: Winchester, 1247.
 Idaho, Boise Basin: Jones, 536.
 Illinois, Galena - Elizabeth quadrangles: Shaw and Trowbridge, 982; Trowbridge and Shaw, 1090.
 Illinois Valley: Sauer, 938.
 West Frankfort: Shaw, 978.
 Indiana, Dearborn County: Bigney, 78.
 Iowa, Lees, 624.
 Galena quadrangle: Shaw and Trowbridge, 982.
 Waukon area: Howell, 492.
 Louisiana, Caddo oil and gas field: Matson, 711.
 Maine, Aroostook County, volcanic area: Williams, 1226.
 Maryland, Upper Cretaceous: Clark, 195.
 Mexico, oil fields: Huntley, 503.
 Minnesota, Minneapolis-St. Paul district: Sardeson, 937.
 Montana, Boulder batholith: Billingsley, 79.
 Cascade County, Hound Creek district: Barnett, 88.
 Helena: Walcott, 1146.
 Little Bitterroot Valley: Meiner, 733.
 Stillwater basin: Calvert, 163.
 Teton County: Stebinger, 1041.
 Three Forks region: Haynes, 440.
 Nevada, Elko County: Hill, 461.

Geologic maps—Continued.

- New Mexico, Burro Mountains: Somers, 1023.
 Luna County: Darton, 258.
 Navajo country: Gregory, 405.
 San Juan County: Bauer, 52.
 New York, Adirondacks, glacial waters: Alling, 10.
 Canton quadrangle: Martin, 707.
 Saratoga quadrangle, glacial: Stoller, 1053.
 Northwest Territories, Tazin and Taltson rivers: Camsell, 165.
 Nova Scotia: Rickard, 902.
 Oklahoma, eastern: Okla. G. S., 805.
 Ontario: Knight, 586; Miller and Knight, 764.
 Beatty-Munro area: Hopkins, 485.
 Big Duck Lake area: Hopkins, 484.
 Boston Creek area: Burrows and Hopkins, 141.
 feldspar deposits: De Schmid, 287.
 Goodfish Lake area: Burrows and Hopkins, 141.
 Kingston area: Baker, 29.
 lead and zinc deposits: Uglow, 1110.
 Magpie-Goudreau area: Parsons, 840.
 Michipicoten area: Parsons, 840.
 Porcupine area: Burrows, 140.
 southeastern: Uglow, 1110.
 Oregon, Columbia River gorge region: Williams, 1228.
 Curry County: Butler and Mitchell, 147.
 Pennsylvania, Chester County, Doe Run-Avondale region: Bliss and Jonas, 88.
 Gettysburg region: Stose and Lewis, 1057.
 southwestern, oil and gas: Pa. T. G. S., 842.
 Quebec, feldspar deposits: De Schmid, 287.
 Harricaw basin: Tanton, 1066.
 Lake St. John district: Dresser, 313.
 Portneuf County (part): Bancroft, 32.
 Saskatchewan, Wood Mountain-Willowbunch area: Rose, 922.
 South Dakota, Harding County: Winchester *et al.*, 1248.
 Perkins County: Winchester *et al.*, 1248.
 Tennessee: Jenkins, 513.
 Johnson County: Jenkins, 514.
 Texas: Udden *et al.*, 1107.
 Lasalle and McMullen counties: Deussen and Dole, 289.
 Utah, coal: Watts, 1166, 1167.
 Castle Valley: Lupton, 660.
 Cottonwood districts: Howard, 490.
 Virginia, Bucu quadrangle: Hinds, 467.
 Clintwood quadrangle: Hinds, 467.

Geologic maps—Continued.

Washington, Conconully and Ruby districts: Jones, 535.

Olympic Peninsula: Weaver, 1176.

Southwestern: Weaver, 1176.

Western: Weaver, 1176.

West Virginia, Jefferson, Berkeley, and Morgan counties: Grimsley, 416.

Lewis and Gilmer counties: Reger, 892.

Mercer County: Krebs and Teets, 602.

Raleigh County: Krebs and Teets, 602.

Summers County: Krebs and Teets, 602.

Wisconsin: Weldman and Schultz, 1181.

Northwestern: Hotchkiss *et al.*, 489.

Wyoming, Basin oil field: Lupton, 659.

Bighorn Mountains: Lupton and Condit, 662.

Big Muddy and Douglas oil and gas fields: Wyo. St. G., 1266.

Central: Hares, 424.

Embar formation: Condit, 224.

Kremont County, Atlantic district: Spencer, 1029.

Copper Mountain district: Trumbull, 1094.

Pilot Butte field: Ziegler, 1275.

Grass Creek field: Hintze, 469.

Little Buffalo Basin field: Hintze, 468.

North Laramie Mountains: Spencer, 1028.

Salt River Range: Mansfield, 694.

Yukon, coal fields: Cairnes, 157.

Geological surveys. *See* Surveys.

Geomorphogeny. *See* Physiographic.

Geomorphology. *See* Physiographic.

Georgia.*Economic.*

Barite: Watson and Sharshall, 1165.

Barytes, Cartersville district: Vivian, 1140.

Feldspar, Macon district: Maynard, 730.

Kaolin, Dry Branch district: Sproat, 1034.

Macon district: Maynard, 730.

Limestone, Coastal Plain: Brantley, 105.

Marl, Coastal Plain: Brantley, 105.

Stentiananthus

Georgia—Continued.*Mineralogy.*

Meteorites, Dalton: Merrill, 749.

Whitfield County: Merrill, 749.

Geysers.

Cause: Von Engeln and Hausman, 1141.

Glacial erosion.

Mountain glacial erosion: Hobbs, 471.

Glacial geology. *See also* Quaternary.

General: Coleman, 213; Roberts, 908.

Cause of glaciation: Roberts, 908.

Chronology of glacial period: Wright, 1264.

Culmination of ice sheets: Leverett, 636.

Gumbotill: Kay, 558.

Iowan drift, Iowa: Kay, 554; Ogilvie, 803.

Loess, origin and age: Savage, 942.

Yarmouth interglacial epoch, duration: Kay, 556.

Alaska, Chisana-White River district: Capps, 170.

Turnagain-Knik region: Capps, 171.

Colorado, Colorado Springs quadrangle: Finlay, 357.

Illinois, Galena-Elizabeth quadrangles: Shaw and Trowbridge, 982; Trowbridge and Shaw, 1090.

Illinois Valley: Sauer, 938.

Indiana: Wood, 1257.

Dearborn County: Bigney, 78.

Greene County: Van Gorder, 1117.

Iowa, Clinton County, Kansan and sub-Aftonian drift: Leighton, 627.

Des Moines, Capitol Hill, Pleistocene: Lees, 625.

Des Moines region: Tilton, 1079.

Wisconsin drift: Tilton, 1078.

Des Moines Valley: Lees, 624.

Galena quadrangle: Shaw and Trowbridge, 982.

Iowan drift: Kay, 557.

Johnson County, Iowa River Valley: Leighton, 626.

Kansan drift: Kay, 554.

Manitoba: Tyrrell, 1105.

Minnesota, Minneapolis-St. Paul district: Sardeson, 937.

Montana, Mission Range: Davis, 271.

New Hampshire, White Mountains: Goldthwait, 395.

New York: Fairchild, 345.

Adirondacks: Ailing, 10.

Crown Point region: Barker, 37

Glacial geology—Continued.

- Northwest Territories, Tazin and Taitson rivers: Camsell, 165.
 Ohio, Ashtabula quadrangle: Carney, 176.
 Cincinnati region: Fenneman, 352.
 Oberlin quadrangle: Carney, 175.
 Ontario, Kingston area: Baker, 29.
 London area: Stansfield, 1036.
 Ottawa Valley: Johnston, 533.
 Rainey River region: Johnston, 534.
 Quebec, Lake St. John district: Dresser, 313.
 Ottawa Valley: Johnston, 533.
 Wisconsin: Martin, 708; Weldman and Schultz, 1181.
 northwestern: Hotchkiss *et al.*, 489.
Glacial lakes. *See also* Beaches; Shore lines; Terraces.
 Lake Agassiz, genesis: Johnston, 534.
 Lake Algonquin: Johnston, 532.
 Lake Bascom: Taylor, 1068.
 New Hampshire, White Mountains: Goldthwait, 395.
 New York: Fairchild, 345.
 Adirondacks: Ailing, 10.
 Lake Pleasant quadrangle: Miller, 766.
 Ohio, Ashtabula quadrangle: Carney, 176.
 Oberlin quadrangle: Carney, 175.

Glacial period. *See* Glacial geology.

Glaciers.

- Alaska, Barry Glacier, retreat 1910–14: Johnson, 517.
 Oregon, Three Sisters: Williams, 1230.
 Variations: Reid, 894.

Glass sand.

- West Virginia, Jefferson, Berkeley, and Morgan counties: Grimsley, 416.

Glaucocnite.

- Formation: Goldman, 394.
 Missouri, southeastern: Ross, 924.

Glomerates: Field, 356.**Gneiss.**

- New York: Newland, 789.

Gold.

- General: Lindgren, 643.
 Ores, classification: Fulton, 377.
 Alaska: Brooks, 119.
 Chisana-White River district: Capps, 170.
 Yukon-Koyukuk region: Eakin, 327.
 Alberta, North Saskatchewan River: Tyrrell, 1103.
 Arizona: Helkes, 443.
 Mohave region: Schrader, 956, 957.
 Tom Reed-Gold Road district: Ritter, 907.
 British Columbia, Bridge River area: Drysdale, 316.
 California and Oregon: Yale, 1268.

Gold—Continued.

- California, Feather River region: McLennan, 685.
 Colorado: Henderson, 449.
 Gilpin County: Bastin and Hill, 51.
 Eastern States: Hill, 462.
 Idaho: Gerry, 381.
 Atlanta District: Bell, 59.
 Manitoba, Manigotagan district: DeLury, 285.
 northern: Bruce, 126.
 Montana: Helkes, 444.
 Nevada: Helkes, 445.
 New Mexico: Henderson, 448.
 Baldy, Aztec mine: Lee, 623.
 Nova Scotia: Rickard, 902.
 Ontario, Beatty-Munro area: Hopkins, 485.
 Big Duck Lake area: Hopkins, 484.
 Boston Creek area: Burrows and Hopkins, 141, 143.
 Goldfish Lake area: Burrows and Hopkins, 141.
 Porcupine area: Burrows, 140.
 Porcupine district: Hore, 487.
 Oregon, Curry County: Butler and Mitchell, 147.
 Quebec, Beauce County: Tyrrell, 1102.
 Saskatchewan, northern: Bruce, 126.
 South Carolina, Walhalla district: Peterson and Flynn, 843.
 South Dakota: Henderson, 447.
 Texas: Henderson, 448.
 Utah: Helkes, 442.
 United States: McCaskey, 666.
 Washington: Gerry, 381.
 Wyoming: Henderson, 447.
 Fremont County, Atlantic district: Spencer, 1029.
 Yukon: Cairnes, 158.
 Mayo area: Cairnes, 159.
 Wheaton district: Cairnes, 159.

Granite.

- New York: Newland, 789.

Graphite.

- New York: Jones, 538.
 Quebec, Amherst: Cirkel, 187.
 United States: Bastin, 48.

Gravel.

- United States: Stone, 1055.

Greenland.**Economic.**

- Cryolite, Ivigtut: Bernard, 62.

Green Mountain belt of rocks, structural features: Gordon, 397.

Gumbotil: Kay, 558.

Gypsum.

- Arizona: Culin, 242.
 Montana, central: Freeman, 375.
 United States: Stone, 1054.

Hawaiian Islands.*Dynamic and structural.*

- Halemaumau: Powers, 857.
 Kilauea, explosive ejectamenta: Powers.
 Mauna Loa, Mokuaweoweo: Wood, 1254.
 Tectonic lines: Powers, 859.
 Volcanoes: Jaggard and Wood, 511.

Physiographic.

General: Powers, 859.

Mineralogy.

Selensulphur: Brown, 123.

History, philosophy, etc.

- American Geologist: Bain, 25.
 Kentucky Geological Survey: Bain, 27.
 Texas, progress of investigation: Udden *et al.*, 1107.
 Homocline and monocline: Daly, 253.

Honduras.*Paleontology.*

Sphenozamites, San Juanito: Humphreys, 498.

Hot Springs. *See* Thermal waters.

Huronian. *See* Pre-Cambrian.

Hydromagnesite.

British Columbia, Atlin: Young, 1271.

Hydrothermal alteration: Stephenson, 1044.

Ice age. *See* Glacial geology.

Ice ages (ancient).

- General: Coleman, 213.
 Banded glacial slates of Permo-Carboniferous age: Sayles, 947.
 Permo-Carboniferous banded glacial slates: Sayles, 947.
 Tertiary, San Juan Mountains: Atwood and Mather, 23.

Idaho.*Economic.*

- General: Bell, 58.
 Antimony, Cœur d'Alene district: Brainard, 100.
 Boise Basin: Jones, 536.
 Cœur d'Alene, origin and distribution of ore: Hershey, 453.
 Gold, Atlanta district: Bell, 59.
 Boise Basin: Jones, 536.
 Mineral production, 1915: Gerry, 381.
 Quartzburg and Grimes Pass porphyry belt: Jones, 536.

Stratigraphic.

- Beckwith and Bear River formations: Mansfield and Roundy, 698.
 Boise Basin: Jones, 536.
 Fort Hall Indian Reservation: Mansfield, 693.
 Jurassic and Cretaceous, southeastern Idaho: Mansfield and Roundy, 699.
 Quartzburg and Grimes Pass porphyry belt: Jones, 536.
 Southeastern Idaho: Mansfield and Roundy, 700.
 Wayan quadrangle: Mansfield, 697.

Igneous and volcanic rocks. *See also* Intrusions; Magmas.*General.*

- Composition, average: Knopf, 590.
 Prismatic structure, types of: Sosman, 1025.
 Segregation under action of gravity: Day, 275.
 Summation of chemical analyses of igneous rocks: Robinson, 912.
 Alaska, Chisana-White River district: Capps, 170.
 Ruby-Kuskokwim region: Mertie and Harrington, 751.
 Turnagain-Knik region: Capps, 171.
 Yukon-Koyukuk region: Eakin, 327.
 Arizona, Carrizo Mountain: Emery, 342.
 Grand Canyon: Noble and Hunter, 793.
 Warren district: Bonillas *et al.*, 90.
 Colorado, Colorado Springs quadrangle: Finlay, 357.
 Gilpin County: Bastin and Hull, 51.
 Cuba, Daiquiri district: Kemp, 564.
 Oriente Province, Firmeza district: Roessler, 915.
 Idaho, Boise Basin: Jones, 536.
 Massachusetts, Blue Hills complex: Barrell, 41.
 Mexico, Hidalgo, Tulancingo: Gálvez, 379.
 Mexico, Puebla, Tehuacan: Böse, 91.
 Montana, Cascade County: Barnett, 38.
 Three Forks region: Haynes, 440.
 Nevada, Lander County: Knopf, 589.
 New Brunswick: Powers, 857a.
 Newfoundland, Conception Bay: Budington, 129.
 New Hampshire, Ammonoosuc district: Lahee, 607.
 New Mexico, Burro Mountains: Somers, 1023.
 Iowa County: Darton, 258.
 Silver City quadrangle: Paige, 824.
 New York: Newland, 789.
 Adirondack region: Miller, 767.
 Canton quadrangle: Martin, 707.
 Lake Pleasant quadrangle: Miller, 766.
 Nova Scotia: Powers, 857a.
 Cape d'Or, Triassic basalt: Powers and Lane, 860.
 Ontario, Beatty-Munro area: Hopkins, 485.
 Halliburton-Bancroft area: Foye, 374.
 Porcupine area: Burrows, 140.
 Oregon, Columbia River gorge region: Williams, 1228.
 Curry County: Butler and Mitchell, 147.
 Panama, Canal Zone: MacDonald, 671.
 Pennsylvania, Chester County, Doe Run-Avondale region: Bliss and Jonas, 88.

Igneous and volcanic rocks—Continued.

Pennsylvania, Gettysburg, Triassic:

Stose and Lewis, 1057.

Quebec, Lake St. John district: Dresser, 313.

Tennessee, Johnson County: Jenkins, 514.

Texas: Udden *et al.*, 1107.

Utah, Tintic district: Crane, 236.

Virginia, Blue Ridge region: Watson and Cline, 1164.

Washington, Conconully and Ruby districts: Jones, 535.

western: Weaver, 1176.

Wisconsin, northwestern Hotchkiss *et al.*, 489.

Wyoming, Fremont County, Atlantic district: Spencer, 1029.

Igneous intrusion. *See* Intrusions.

Infusorial earth.

Nova Scotia, Queens County: Faribault, 347.

Illinois.**General.**

Report of State geologist: DeWolf, 291.

Survey report, 1910-11: DeWolf, 290.

Soils, Bond County: Hopkins *et al.*, 479.

Kankakee County: Hopkins, 478.

Pike County: Hopkins *et al.*, 480.

Tazewell County: Hopkins *et al.*, 482.

Winnebago County: Hopkins *et al.*, 481.

Economic.

Coal: Young, 1272.

accumulation of vegetable matter: Savage, 941.

district VI: Cady, 156.

Springfield quadrangle: Savage, 940.

Galena-Elizabeth quadrangles: Shaw and Trowbridge, 982.

Lead and zinc, Elizabeth and Galena quadrangles: Trowbridge and Shaw, 1090.

Mineral production, 1909-10: Cady, 155.

Mineral resources, 1915: Skewes, 1005.

Oil and gas, Birds quadrangle: Rich, 900.

Vincennes quadrangle: Rich, 901.

Petroleum: Kay, 550.

Springfield quadrangle: Savage, 940.

Dynamic and structural.

Bremen anticline, Randolph County: Kay, 551.

Canton and Avon quadrangles, geologic structure: Savage, 943.

Colmar oil field, structure: Morse, 782.

Elizabeth quadrangle: Trowbridge and Shaw, 1090.

Galena quadrangle: Trowbridge and Shaw, 1090.

Illinois Valley: Sauer, 938.

Subsidence from coal mining: Young, 1272.

Illinois—Continued.**Phytographic.**

Elizabeth quadrangle: Trowbridge and Shaw, 1090.

Extinct lakes: Shaw, 978.

Galena quadrangle: Trowbridge and Shaw, 1090.

Galena-Elizabeth quadrangles: Shaw and Trowbridge, 982.

Illinois Valley: Sauer, 938.

Southern Illinois, extinct lakes: Shaw, 978.

Stratigraphic.

Alexandrian rocks, northeastern Illinois: Savage, 944.

Birds quadrangle: Rich, 900.

Bremen anticline, Randolph County: Kay, 551.

Canton and Avon quadrangles, geologic structure: Savage, 943.

District VI: Cady, 156.

Elizabeth quadrangle: Trowbridge and Shaw, 1090.

Galena quadrangle: Trowbridge and Shaw, 1090.

Galena-Elizabeth quadrangles: Shaw and Trowbridge, 982.

Illinois Valley: Sauer, 938.

Loess, origin and age: Savage, 942.

Ste. Genevieve limestone, Monroe County: Weller, 1184.

Saline, Williamson, Pope, and Johnson Counties: Brokaw, 111.

Springfield quadrangle: Savage, 940.

Vincennes quadrangle: Rich, 901.

Palaeontology.

Acanthotelson stimpsoni, uropods, Mason Creek: Cockerell, 208.

Alexandrian rocks, northeastern Illinois: Savage, 944.

Atactocrinus, Richmond: Weller, 1183.

Coal Measures Amphibia: Moodie, 771.

Elizabeth quadrangle: Trowbridge and Shaw, 1090.

Galena quadrangle: Trowbridge and Shaw, 1090.

Insecta, Mason Creek: Cockerell, 211.

Ste. Genevieve fauna, Monroe County: Weller, 1184.

Petrology.

Geodes, Keokuk beds: Van Tuyl, 1126.

Mineralogy.

Barite, Hanover: Shipton, 992.

Indiana.**General.**

Dearborn County: Bigney, 78.

Green County: Van Gorder, 1117.

Jefferson County: Culbertson, 239.

Soils, Fountain County: Orahood, 809.

Grant County: Hurst *et al.*, 505.

Starke County: Grimes *et al.*, 415.

Wells County: Sharp and Wiley, 1071.

White County: Bushnell and Erni, 144.

Indiana—Continued.*Economic.*

Greene County: Van Gorder, 1117.

Oil and gas: Wright, 1259.

Physiographic.

Valley trenching and gradation plains, southern Indiana: Malott, 691.

Stratigraphic.

Dearborn County: Bigney, 78.

Glacial history: Wood, 1257.

Greene County: Van Gorder, 1117.

Jefferson County: Culbertson, 239.

Laurel: Prosser, 870.

Insecta.

Ancestry: Tothill, 1088.

Colorado: Cockerell, 211.

Florissant: Cockerell, 211.

Coleoptera: Wickham, 1220.

Elateridae: Wickham, 1221.

Glossina (tsetse-fly): Cockerell, 210.

Illinois, Mazon Creek: Cockerell, 211.

Intraformational breccias, origin and classification: Field, 356.

Intraformational conglomerates, origin and classification: Field, 356.

Intrusions. *See also* Dikes; Igneous and volcanic rocks; Laccoliths; Magmas.

Arizona, Carrizo Mountain: Emery, 342.

Mechanics of intrusion, Black Hills pre-Cambrian granite: Paige, 825.

Ontario, Hallburton-Bancroft area: Foye, 374.

South Dakota, Black Hills, pre-Cambrian granite: Paige, 825.

Invertebrata (general). *See also* Anthozoa; Brachlopoda; Bryozoa; Crustacea; Echinodermata; Foraminifera; Insecta; Mollusca; Problematica; Spongia; Vermes.

California, Tejon fauna: Dickerson, 294.

Cambrian: Walcott, 1143.

Carboniferous, Kansas and Oklahoma: Beede, 56.

Chapman sandstone fauna: Williams, 1226.

Cincinnatian types: Foerste, 367.

Fernando fauna, Los Angeles, California: Moody, 775.

Manitoba, Ordovician: Parks, 839.

Maryland, Upper Cretaceous: Clark *et al.*, 196.

New Mexico, San Juan County, non-marine Cretaceous: Stanton, 1037.

New York, Paleozoic: Ruedemann, 930.

Ontario, Kingston area: Wilson and Mather, 1240.

Patricia, Silurian: Parks, 839.

Ste. Genevieve fauna, Monroe County, Illinois: Weller, 1184.

West Virginia, Raleigh County, Carboniferous: Price, 866.

Invertebrata (general)—Continued.

Wyoming, Embar formation: Branson, 104.

Iowa.*General.*

Report State geologist, 23d, 1914: Kay, 552.

Economic.

Galena quadrangle: Shaw and Trowbridge, 982.

Iron, Waukon: Howell, 492.

Lithographic stone, Lithograph City, Floyd County: Webster, 1177.

Mineral production, 1913-4: Kay, 553.

Dynastic and structural.

Brecciation, St. Louis limestone: Van Tuyl, 1122.

Fault systems: Keyes, 570.

Faulting: Keyes, 566.

Physiographic.

Des Moines Valley: Lees, 624.

Galena quadrangle: Shaw and Trowbridge, 982.

Peneplains, Driftless Area: Hughes, 497.

Waukon area, Allamakee County: Howell, 492.

Stratigraphic.

Carboniferous: Smith, 1009.

Chouteau limestone, terranean affinities: Keyes, 568.

Clinton formation, Dubuque County: Howell, 491.

Galena quadrangle: Shaw and Trowbridge, 982.

Glaciation, Des Moines Valley: Lees, 624.

Iowan drift: Kay, 557; Ogilvie, 803.

Kansas drift, southern Iowa: Kay, 554.

Kansas and sub-Aftonian drift, Clinton County: Leighton, 627.

Pleistocene, Capitol Hill, Des Moines: Lees, 625.

Iowa River valley, Johnson County: Leighton, 626.

Ste. Genevieve, southeastern Iowa: Weller and Van Tuyl, 1187.

Southwestern Iowa: Smith, 1010.

Terrace, age, Des Moines region: Tilton, 1079.

Waukon area, Allamakee County: Howell, 492.

Wisconsin drift, Des Moines region: Tilton, 1078.

Yarmouth interglacial epoch, duration: Kay, 556.

Paleontology.

Atrypa reticularis: Thomas, 1075.

Carboniferous: Smith, 1009.

Cephalopoda, Niagaran: Thomas, 1074.

Crinoida, Monticello: Thomas, 1073.

Niagaran corals: Thomas, 1076.

Pseudorthoceras knoxense, apical end, Des Moines: Girty, 389.

Trilobites, Maquoketa beds, Fayette County: Slocum, 1007.

Iowa—Continued.

Petrology.

Geodes, Keokuk beds: Van Tuyl, 1126.
Oolite, Clayton County: Van Tuyl, 1129.

Iron.

General: Joseph, 544.

Bog ore deposits, formation and distribution: Dake, 247.

Exploration, use of geology: Leith, 628.

Hematite, zonal growth: Sosman and Hostetter, 1027.

Oriskany ore: Holden, 473.

Residual ores, formation and distribution: Dake, 246.

Arizona: Joseph, 544.

Cuba: Little 645.

Dalquiri district: Kemp, 564; Lindgren and Ross, 644.

Dalquiri and Firmeza deposits: Singewald and Miller, 1001.

Mayari district: Kemp, 563; Leith and Mead, 629.

Oriente Province, Firmeza district: Roessler, 915.

Iowa, Waukon area: Howell, 492.

Michigan, Marquette Range: White, 1203.

Minnesota, Mesabi iron range: Wolff, 1253.

Newfoundland, Wabana: Hayes, 437; McGrath, 675.

Ontario, Michipicoten area: Parsons, 840.

Oregon, Curry County: Butler and Mitchell, 147.

United States: Burchard, 130.

West Virginia, Jefferson, Berkeley, and Morgan counties: Grimsley, 416.

Wisconsin, eastern: Savage and Ross, 945.

Isostasy.

Isostatic compensation: Hobbs, 470.

Planetesimal theory, relation to isostasy: Chamberlin, 182.

Jointing.

General: Ehrenfeld, 335.

Prismatic structure, types of, in igneous rocks: Sosman, 1025.

Jurassic.

Stratigraphy.

General.

Morrison formation: Mook, 776.

age: Knowlton, 593.

Alberta, Crowsnest Pass: McLearn, 683.

British Columbia, Flathead area: MacKenzie, 678.

Graham Island: MacKenzie, 679.

Vancouver Island: Clapp, 188.

Colorado, Colorado Springs quadrangle: Finlay, 357.

Idaho, Fort Hall Indian Reservation: Mansfield, 693.

southeastern: Mansfield and Roundy, 698, 699.

Jurassic—Continued.

Stratigraphy—Continued.

Montana, Cascade County: Barnett, 38.

Three Forks region: Haynes, 440.

Oregon, Curry County: Butler and Mitchell, 147.

Texas: Udden *et al.*, 1107.

Utah, Castle Valley: Lupton, 660.

Wyoming, North Laramie Mountains: Spencer, 1028.

Salt River Range: Mansfield, 694.

Paleontology.

Alaska, Matanuska Valley, Plantæ: Knowlton, 590.

Mexico, Mixteca Alta, flora liasica: Wieland, 1222.

Puebla, Liasic plants: Diaz Lozano, 292.

Vera Cruz, Liasic plants: Diaz Lozano, 292.

Morrison fauna: Mook, 776.

Utah, Apatosaurus: Holland, 474.
tortoise: Gilmore, 384.

Kansas.

Economic.

Joplin ore deposits: Bain, 26.

Stratigraphic.

Table of formations: Keyes, 565.

Paleontology.

Carboniferous: Beede, 56.

Kaolin.

Origin: Watkins, 1158.

Appalachian States, southern: Watkins, 1158.

Georgia, Dry Branch district: Sproat, 1034.

Macon district: Maynard, 730.

South Carolina, Alken district: Sproat, 1034.

Kentucky.

Economic.

Barite: Watson and Sharshall, 1165.

Oil and gas possibilities: Fohs, 368.

Building stone, Bowling Green field: Crump, 238.

Dynamic and structural.

Faulting, north central Kentucky: Miller, 759.

Physiographic.

Extinct lakes: Shaw, 978.

Stratigraphic.

General: Fohs, 368.

Eocene: Berry, 63.

Mississippian section, west central Kentucky: Butts, 150.

Paleontology.

Eocene: Berry, 63.

Fishes, Vanceburg: Miller, 760.

Killarney granite, age: Collins, 220.

Labrador.

Physiographic.

Torngats: Coleman, 215.

Lake Agassiz, genesis: Johnston, 534.

Lake Pleasant quadrangle, New York: Miller, 766.

Lakes, extinct.

Illinois, southern: Shaw, 978.

Lakes, glacial. *See* Glacial lakes.

Lamellibranchiata. *See* Pelecypoda.

Landslides.

In unconsolidated sediments: Newland, 791.

New York, Hudson Valley: Newland, 791.

Panama Canal: Goethals, 393; MacDonald, 670; Van Hise *et al.*, 1118.

Laramie formation: Bowen, 93.

Lava.

Ellipsoidal lavas, Glacier National Park, Montana: Burling, 134.

Origin: Daly, 252.

Pillow lavas, Watchung Mountains, New Jersey: Lewis, 640.

Lead.

General: Joseph, 545.

Ores, classification: Fulton, 377.

Arizona: Heikes, 443; Joseph, 545.

British Columbia, Ainsworth district: Schofield, 954.

California and Oregon: Yale, 1268.

Central States: Dunlop and Butler, 323.

Colorado: Henderson, 449.

Eastern States: Hill, 462.

Idaho: Gerry, 381.

Illinois, Galena-Elizabeth quadrangles: Shaw and Trowbridge, 982; Trowbridge and Shaw, 1090.

Joplin ore deposits: Bain, 26.

Missouri, Washington County: Ball, 30.

Montana: Heikes, 444.

Nevada: Heikes, 445.

New Mexico: Henderson, 448.

Ontario: Uglow, 1108, 1110.

Quebec: Uglow, 1108, 1110.

Portneuf County: Bancroft, 32.

South Dakota: Henderson, 447.

Texas: Henderson, 448.

United States: Siebenthal, 996, 997, 998.

Utah: Heikes, 442.

Virginia, southwestern: Ball and Thompson, 31.

Washington: Gerry, 381.

Wyoming: Henderson, 447.

Leeward Islands.

Physiographic.

Littoral and sublittoral features: Vaughan,

Limestone.

General.

Magnesia in limestone: Loughlin, 652.

Origin: Daly, 252.

mottled limestones: Van Tuyl, 1120.

Georgia, Coastal Plain: Brantley, 105.

Mississippi: Logan, 650.

Montana, central: Freeman, 375.

Nova Scotia: Woodman, 1258.

West Virginia, Jefferson, Berkeley, and Morgan counties: Grimsley, 416.

Linear force of growing crystals: Becker and Day, 55.

Lithogenesis of sediments: Van Tuyl, 1125.

Lithology. *See* Petrology.

Loess.

Arkansas, Crowley's Ridge: Shimek, 985.

Bibliography: Cable, 154.

Iowa, Des Moines, Capitol Hill, Pleistocene: Lees, 625.

Origin: Trowbridge and Shaw, 1090.

Origin and age: Savage, 942.

Types in Mississippi Valley: Shimek, 987.

Louisiana.

Economic.

Caddo oil and gas field: Matson, 711.

Natural gas, Caddo field: Matson, 711.

Petroleum, Caddo field: Matson, 711.

Salines, origin: Harris, 427; Norton, 801.

Dynamic and structural.

Delta of Mississippi: Shaw, 977.

Intraformational conglomerate and breccia, Shreveport: Emerson, 341.

Stratigraphic.

Caddo oil and gas field: Matson, 711.

Citronelle formation: Matson, 713.

Paleontology.

Catahoula sandstone flora: Berry, 68.

Lower Silurian. *See* Ordovician.

Magmas. *See also* Intrusions.

General: Loughlin, 653.

Montana, Boulder batholith: Billingsley, 79.

Water as a magmatic constituent: Morey, 778.

Magmatic differentiation.

Differentiation in intercrustal magmatic basins: Harker, 426.

Magnesia.

- General: Culin, 240.
 Arizona: Culin, 240.
 California: Yale, 1270.
 Bissell: Palmer, 834.

Maine.**Economic.**

- Feldspar: Watts, 1168.

Dynamic and structural.

- Subsidence of coast: Davis, 265.

Stratigraphic.

- Chapman sandstone, Maine: Williams, 1226.

- Pleistocene, Mt. Desert Island: Blaney and Loomis, 87.

Paleontology.

- Chapman sandstone fauna: Williams, 1226.

- Pleistocene, Mt. Desert Island: Blaney and Loomis, 87.

- Spirifer, Silurian, Washington Co.: Williams, 1225.

Mammalia.

- Anthropoids: Gregory, 412.

- Bear, Pliocene, Oregon: Merriam *et al.*, 743.

- Beluga, Leda clay, Quebec: Ardley, 16.

- Bison antiquus: Chandler, 184.

- California, Chanac fauna: Merriam, 740.

- Tehachapi region: Buwalda, 152.

- Capromeryx, Rancho La Brea, California: Chandler, 183.

- Cretaceous: Matthew, 721.

- Elephas: Kunz, 605; Matthew, 727.

- Eodelphis, Red Deer River: Matthew, 721.

- Equus, ancestry: Matthew, 720.
 relations to Pliohippus: Merriam, 738.

- Evolution, primates: Gregory, 411.

- Florida: Sellards, 968.

- Halitherium, Porto Rico: Matthew, 722.

- Hipparion-like horses: Merriam, 739.

- Isolobodon, Porto Rico: Allen, 9.

- Lagomorphs: Dice, 293.

- Mammoth: Matthew, 719.

- Mastodon: Matthew, 719.

- Molar patterns, primates: Gregory, 410.

- Morrison fauna: Mook, 776.

- Mustelid, Taxidea, Thousand Creek
 Pliocene: Butterworth, 148.

- Nesophontidae: Anthony, 14.

- Octodont, Porto Rico: Allen, 9.

- Oregon, Ironside: Merriam, 741.

- Phylogeny, anthropoids: Gregory, 411.

- Pleistocene Mammalia: Hay, 434.

- Pliohippus, California: Merriam, 738.

- South Dakota: Troxell, 1091, 1093.
 Proboscidea, ligamentum teres: Barbour, 34.

- Sirenian, Tertiary, Porto Rico: Matthew, 722.

- Skull elements in Tetrapoda, nomenclature: Gregory, 413.

Mammalia—Continued.

- Sternum, origin: Williston, 1239.

- Tertiary: Cope and Matthew, 229.

- Tetrabelodon osborni, Nebraska: Barbour, 35.

- Thlaodon: Matthew, 721.

- Titanotheres, Oligocene: Osborn, 814.

- Tributerculy theory: Gregory, 410.

- Xenarthra (Edentata), Pleistocene,
 Texas: Hay, 436.

Man, fossil.

- General: Osborn, 812.

- Antiquity in North America: Wissler, 1249.

- British Columbia, Savona: Drysdale, 316.

- Florida, Pleistocene: Sellards, 968, 971.

- Human remains associated with extinct vertebrates, Florida: Sellards, 969.

- Origin: Gregory, 411.

Manganese.**General.**

- Geologic occurrence: Runner, 935.

- California, San Bernardino County,
 Owl Head: Mann, 692.

- Mexico, Lower California, Mulege:
 McQueston, 686; Wallace, 1149.

- Nova Scotia, New Ross: Kramm, 601.

- Tennessee: Watkins, 1159.

- eastern: Purdue, 878.

- Virginia: Hewett, 459.

- United States: Hess, 456, 457.

Manitoba.**General.**

- Amisk-Athapapuskow Lake area:
 Bruce, 127.

- Churchill River region: Alcock, 4.

- Hayes River: Tyrrell, 1105.

- Hudson Bay region: Savage and Van
 Tuyl, 946.

- Nelson River: Tyrrell, 1105.

Economic.

- General: Harding, 422.

- Amisk-Athapapuskow Lake area:
 Bruce, 127.

- Gold, Manigotagan district: DeLury, 285.

- northern Manitoba: Bruce, 126.

- Gold Lake district: Packard, 823.

- Northwestern Manitoba: Wallace and
 DeLury, 1152.

- The Pas region: DeLury, 286.

Dynamic and structural.

- Corrosive action of brines: Wallace,
 1150, 1151.

Phytographic.

- General: Dowling, 312.

Stratigraphic.

- Amisk-Athapapuskow Lake area:
 Bruce, 127.

- Churchill River region: Alcock, 4.

- Hayes River: Tyrrell, 1105.

- Manigotagan gold district: DeLury,
 285.

Manitoba—Continued.*Stratigraphic*—Continued.

Nelson River: Tyrrell, 1105.

Northern Manitoba: Bruce, 126.

Pembina Mountain, southern Manitoba:
MacLean, 682.*Paleontology*.

Ordovician: Parks, 839.

Underground water.

Winnipeg area: Tyrrell, 1101.

Map making. *See* Cartography.Maps. *See* Cartography and Geologic maps.**Marble**.

General: Bowles, 95.

Alabama: Prouty, 872, 873.

New York: Newland, 789.

Markings on rocks: Cox and Dake, 232.

Marl.

Georgia, Coastal Plain: Brantley, 105.

Mississippi: Logan, 650.

Maryland.*Economic*.

Barite: Watson and Sharshall, 1165.

Copper: Overbeck, 818.

Feldspar: Watts, 1168.

Manganese: Hewett, 458.

Physiographic.

Cretaceous, Upper: Clark, 195.

Stratigraphic.

Arundel formation: Mook, 776.

Calvert formation: Berry, 66.

Cretaceous, Upper: Clark, 195.

correlation: Clark *et al.*, 197.

Silurian: Swartz and Prouty, 1060.

Paleontology.

Arcas: Sheldon, 983.

Calvert flora: Berry, 66.

Cycadeoides: Wieland, 1224.

Plagiozamites, coal measures, Garrett
County, Maryland: Bassler, 45.Upper Cretaceous: Clark *et al.*, 196.*Petrology*.

Upper Cretaceous: Goldman, 394.

Massachusetts.*General*.

Berkshire region: Cleland, 205.

Dynamic and structural.Landslips in basin of Lake Bascom:
Taylor, 1068.*Physiographic*.

General: Keith, 560.

Stratigraphic.

Blue Hills complex: Barrell, 41.

Permo-Carboniferous banded glacial
slates: Sayles, 947.*Petrology*.Diabase cylinders, Holyoke: Emerson,
339.*Mineralogy*.Pseudomorphs, ilmonite after diaban-
tite: Emerson, 340.Meetings. *See* Associations.Mercury. *See* Quicksilver.**Mesozoic** (undifferentiated).Alaska, Chisana-White River district:
Capps, 170.

Yukon-Koyukuk region: Eakin, 327.

Metallogenetic epochs in pre-Cambrian of
Ontario: Miller and Knight,
764.**Metamorphism**.Arizona, Warren district: Bonillas *et*
al., 90.Hornblende gabbro, zonal weathering:
Brokaw and Smith, 113.

New form: Keith, 561.

Newfoundland, Conception Bay: Bud-
dington, 129.**Meteorites**.

General: Farrington, 349.

Catalogue, Field Museum: Farrington,
348.U. S. National Museum collection:
Merrill, 745.Chemical and mineralogical composi-
tion: Merrill, 747.Composition, minor constituents: Mer-
rill, 746.

Cookeville, Tennessee: Merrill, 748.

Dalton, Georgia: Merrill, 749.

Lake Okechobee, Florida: Merrill, 750.

Whitfield County, Georgia: Merrill,
749.**Mexico**.*General*.

Altar district, Sonora: Tolman, 1080.

Analyses: Mexico, Inst. Geol., 756.

Economic.

Antimony: Flores, 362.

Jalisco: Villafañá, 1138.

Las Minas district, Vera Cruz: Brins-
made, 108.Manganese, Mulege, Lower California:
McQuesten, 686; Wallace, 1149.Petroleum: Huntley, 503; Ordóñez,
811.

eastern Mexico: Dumble, 319.

Furbero field: DeGolyer, 281.

Phosphate, Monterrey, Nuevo Leon:
Flores, 361, 363.Precious stones, Lower California:
Wittich, 1251.Salt deposits, Ojo de Liebre, Lower
California: Wittich, 1250.San Miguel Peras, Oaxaca: Girault,
388.Santa Eulalia district, Chihuahua:
Prescott, 864.*Dynamic and structural*.Colima, catalog of eruptions: Arreola,
18.

Earthquake, Volcano Lake: Anon, 1280.

Seismic movements, 1911: Mexico,
Inst. Geol., 755.

1912: Mexico, Inst. Geol., 757.

Physiographic.

General: Thayer, 1072.

Explosion craters: Darton, 260.

Mexico—Continued.

Stratigraphic.

- Cretaceous and Tertiary, eastern Mexico : DeGolyer, 282.
- Furbero oil field : DeGolyer, 281.
- Hidalgo, Tulancingo : Gálvez, 379.
- Jalisco : Villafañá, 1138.
- Tecalitlán : Paredes, 836.
- Lower California, Ojo de Liebre : Wittich, 1250.
- Oil fields : Huntley, 503.
- San Miguel Peras, Oaxaca : Girault, 388.
- Santa Eulalia district, Chihuahua : Prescott, 864.
- Sierra Madre, Vera Cruz : Brinsmade, 108.
- Tehuacan, Puebla : Böse, 91.
- Tuxpam beds, age : Dumble, 320.

Paleontology.

- Plants, Liassic, Huachuquingo, Puebla : Díaz Lozano, 292.
- Huayacocotla, Vera Cruz : Díaz Lozano, 292.
- Flora liasica, Mixteca Alta : Wieland, 1222.
- Triassic plants, Sonora : Humphreys, 500.

Petrology.

- Catalogue of rocks : Mexico, Inst. Geol., 758.

Underground water.

- Coahuila : Villarello, 1139.
- Hidalgo, Tulancingo : Gálvez, 379.
- Jalisco, Tecalitlán : Paredes, 836.
- Michoacan, Yurecuaro : Paredes, 835.
- Pachuca y Real del Monte : Ordóñez, 810.
- Tehuacan, Puebla : Böse, 91.

Mica.

- General : Cullin, 241.
- Arizona : Cullin, 241.
- United States : Schaller, 950.

Michigan.

Economic.

- Marquette Range : White, 1203.

Dynamic and structural.

- Keweenaw fault : Lane, 613.

Stratigraphic.

- Detroit River series, age : Stauffer, 1038.
- Pre-Cambrian : Lawson, 620.
- Keweenaw region : Lane, 613.

Mineral water.

- United States : Dole, 304.

Mineralogy (general). See also Meteorites ; Technique. For regional, see names of States. For particular minerals, see list, p. 150.

- Alunite, psilomelanite, and titanite : Wherry, 1197.
- Bornite, composition : Allen, 7.
- Calcium carbonate : Merwin, 752.
- the several forms : Johnston *et al.*, 529.
- Cavities in First Watchung Mountain zeolite deposits : Wherry, 1195.

Mineralogy (general)—Continued.

- Celestite : Cullin, 244.
- Crystals, growth of : Taber, 1061.
- Determination of minerals : Edwards, 333 ; Murdoch, 784.
- Glauberite casts : Wherry, 1196.
- Glauberite crystal cavities, Triassic rocks, eastern Pennsylvania : Wherry, 1196.
- Intergrowths of minerals : Goodchild, 396.
- Kaolinite, intumescent : Schaller and Bailey, 952.
- Melanochoalcite, variable composition : Hunt and Kraus, 501.
- Mellilite group : Schaller, 948.
- Menilite, organic structure : Herrera, 452.
- Minerals, opaque, microscopical determination : Murdoch, 784.
- Muscovite in Cockeysville marble, optical properties : Clark and Hunt, 194.
- New mineral names : Ford, 360.
- Optical mineralogy : Edwards, 333.
- Pyrite, absence from certain zeolite localities : Lewis, 641.
- Sericite a low temperature hydrothermal mineral : Rogers, 916.
- Strontianite : Cullin, 244.
- Sundry minerals : Schaller, 948.
- Textbook : Dana, 257.
- Veins of asbestiform minerals, origin : Taber, 1064.

Minerals described. See list, p. 150.

Minnesota.

Economic.

- Clay : Grout, 417.
- Iron : Emmons, 343.
- Mesabi range : Wolff, 1253.
- Mesabi iron range : Wolff, 1253.
- Peat : Soper, 1024.

Physiographic.

- General : Johnston, 525.
- Minneapolis-St. Paul district : Sardsen, 937.

Stratigraphic.

- Mesabi iron range : Wolff, 1253.
- Minneapolis-St. Paul district : Sardsen, 937.

Minneapolis-St. Paul folio (no. 201) : Sardsen, 937.

Miocene. See Tertiary.

Miscellaneous. See also Addresses.

- Literature on geology : Condit, 225.

Mission Range, Montana : Davis, 271.

Mississippi.

Economic.

- Marls and limestones : Logan, 650.
- Oil and gas possibilities : Hopkins, 483.

Stratigraphic.

- General : Logan, 650.
- Crittendon formation : Matson, 713.
- Focene : Berry, 63.
- Vicksburg-Jackson area : Hopkins, 483.

Mississippi—Continued.*Paleontology.*

- Aracas: Sheldon, 983.
 Catahoula sandstone flora: Berry, 68.
 Eocene: Berry, 63.
 Zania, Meridian: Berry, 75.

Mississippian. *See* Carboniferous.

Missouri.*Economic.*

- Joplin ore deposits: Bain, 26.
 Joplin district: Boyd, 98.
 Lead, Washington County: Ball, 30.
 Zinc, southwestern Missouri, origin: Cox *et al.*, 233.

Stratigraphic.

- Chouteau limestone, terranean affinities: Keyes, 568.
 Devonian, southeastern Missouri: Weller, 1186.
 Edgewood limestone, Pike County, Missouri: Rowley, 926.
 Eureka Springs-Harrison quadrangles: Purdue and Miser, 879.
 Table of formations: Keyes, 565.

Paleontology.

- Pleistocene, Mollusca, Callaway County: Greger, 403.

Petrology.

- Geodes, Keokuk beds: Van Tuyl, 1126.
 Jasperoid, southwestern Missouri: Cox *et al.*, 233.

Mineralogy.

- Glauconite, southeastern Missouri: Ross, 924.

Molding sand.

- New York, Albany molding sand: Newland, 790.

Mollusca. *See also* Cephalopoda; Gastropoda; Pelecypoda.

- California, Pliocene, Jacalitos Creek: Nomland, 796.
 San Jose region, Cretaceous and Tertiary: Hall and Ambrose, 421.
 Carboniferous, Kansas and Oklahoma: Beede, 56.
 Choctawhatchee marl, Florida: Mansfield, 701.
 Fernando fauna, Los Angeles, California: Moody, 775.
 Georgia, Flint River, Oligocene: Dall, 250.
 Missouri, Callaway County, Pleistocene: Greger, 403.
 Mohave Desert: MacDougal *et al.*, 674.
 New Mexico, San Juan County, non-marine Cretaceous: Stanton, 1037.
 North Carolina, Miocene: Olsson, 807.
 Tertiary, western Washington: Weaver, 1174.
 Triassic, Alaska: Martin, 705.
 Virginia, Miocene: Olsson, 807.

Molluscolidea. *See* Brachiopoda; Bryozoa.

Molybdenum.

- General: Fleck, 359; Horton, 488.
 British Columbia, Lost Creek: Drysdale, 315.
 United States: Hess, 454.

Monasite.

- North Carolina: Pratt, 861.

Montana.*Economic.*

- Boulder batholith: Billingsley, 79.
 Butte district, physiographic conditions at time of ore enrichment: Atwood, 21.
 Coal, Great Falls field, Barnett, 38.
 Stillwater basin: Calvert, 163.
 Teton County: Stebinger, 1041.
 Copper, Butte: Thompson, 1077.
 Covellite, Butte: Thompson, 1077.
 Eastern Montana: Rowe and Wilson, 925.
 Gypsum, central Montana: Freeman, 375.
 Limestone, central Montana: Freeman, 375.
 Marysville district: Ropes, 920, 921.
 Mineral production, 1915: Heikes, 444.
 Oil and gas possibilities, north-central Montana: Stebinger, 1042.
 Stillwater basin, Stillwater and Carbon counties: Calvert, 163.
 Teton County: Stebinger, 1041.

Dynamic and structural.

- Boulder batholith: Billingsley, 79.
 Lombard overthrust: Haynes, 440.

Physiographic.

- Butte district, physiographic conditions at time of ore enrichment: Atwood, 21.
 Little Bitterroot Valley: Meinzer, 733.
 Mission Range: Davis, 271.
 Montana batholith: Billingsley, 79.

Stratigraphic.

- Borings: Huntley, 504.
 Boulder batholith: Billingsley, 79.
 Cambrian, Helena: Walcott, 1146.
 Devonian, upper: Haynes, 439.
 Eastern Montana: Rowe and Wilson, 925.
 Hound Creek district, Cascade County: Barnett, 38.
 Little Bitterroot Valley: Meinzer, 733.
 Morrison formation: Mook, 776.
 North-central Montana: Stebinger, 1042.
 Pre-Cambrian, Helena: Walcott, 1146.
 Stillwater basin, Stillwater and Carbon counties: Calvert, 163.
 Teton County: Stebinger, 1041.
 Three Forks region: Haynes, 440.

Paleontology.

- Anomalous fossils, Dawson County: Hollick, 477.
 Devonian, upper: Haynes, 439.
 Selaginella, northeastern Montana: Knowlton, 594.

Montana—Continued.

Petrology.

Ellipsoidal lavas, Glacier National Park: Burling, 134.

Three Forks region: Haynes, 440.

Underground water.

Little Bitterroot Valley: Meinzer, 733.

Moraines.

New England: Katz, 546.

New Hampshire, Bethlehem: Goldthwaite, 395.

New York, Crown Point region: Barker, 37.

Morrison formation: Mook, 776.

Natural gas.

General: Johnson and Huntley, 524.

Accumulation, diastrophic theory: Daly, 251.

Appalachian geosyncline, deep sand possibilities, West Virginia: Reger, 893.

Connate water in oil and gas sands: Johnson, 523; Shaw, 979; Washburne, 1155.

Dakota sand, oil, gas, and water content: Huntley, 504.

Diastrophic theory of oil and gas accumulation: Daly, 251.

Migration and separation of hydrocarbons, relation to structure: Trumbull, 1095.

Origin: Bownocker, 97.

Illinois, Birds quadrangle: Rich, 900.

Vincennes quadrangle: Rich, 901.

Indiana: Wright, 1259.

Kentucky: Fohs, 368.

Louisiana, Caddo field: Matson, 711.

Ohio, Cleveland field: Bownocker, 96.

Woodsfield quadrangle: Condit, 223.

Oklahoma, central and southern: Wegemann, 1179.

Ontario: Knight, 586.

Pennsylvania, southwestern: Pa. T. G. S., 842.

Texas, Dallas region: Matson, 712.

northern: Shaw, 980.

United States: Northrop, 800.

West Virginia, Lewis and Gilmer counties: Reger, 892.

Wyoming, Basin oil field: Lupton, 659.

Big Muddy and Douglas oil and gas fields: Wyo. St. G., 1266.

Grass Creek field: Hintze, 469.

Little Buffalo Basin field: Hintze, 468.

Nebraska.

Economic.

Barite, Franklin County: Burnett, 139.

Paleontology.

Epidermis, Carboniferous: Whitford.

Nebraska—Continued.

Paleontology—Continued.

Proboscidea, ligamentum teres: Barbour, 34.

Tetrabelodon osborni, Boyd County: Barbour, 35.

Mineralogy.

Barite, Franklin County: Burnett, 139.

Nevada.

General.

Soda Lakes, Fallon area: Lee and Clark, 622.

Economic.

Eastern Nevada: Hill, 461.

Gold, Nye County, Golden Arrow district: Ferguson, 353.

Manhattan, White Caps Mine: Dynan, 326.

Mineral production, 1915: Helkes, 445.

Platinum, Goodsprings: Crampton, 235.

Rochester district: Schrader, 955.

Tin, Lander County: Knopf, 589.

Tonopah: Anon., 1279.

Wood tin, northern Nevada: Knopf, 591.

Yellow Pine District: Palmer, 833.

Zinc, Yellow Pine District: Palmer, 833.

Dynamic and structural.

Earthquake, Pleasant Valley: Berry, 77.

Stratigraphic.

Cedar Mountain region: Merriam, 737.

Eastern Nevada: Hill, 461.

Tonopah: Anon., 1279.

Paleontology.

Mustelid, Taxidea, Thousand Creek Pliocene: Butterworth, 148.

Tertiary Vertebrata, Cedar Mountain: Merriam, 737.

Mineralogy.

Hydrozincite, Lincoln County: Ford and Bradley, 370.

Miloschite, Ely: Wherry and Brown, 1199.

Vashegyite, Manhattan: Wherry, 1194.

New Brunswick.

General.

St. John area: Hayes, 438.

Economic.

Moncton area: Wright, 1265.

Stratigraphic.

Cambrian: Matthew, 717.

Paleontology.

Cambrian: Matthew, 717.

Triassic: Powers, 857a.

Newfoundland.

Economic.

Coal: McGrath, 676.

Newfoundland—Continued.*Stratigraphic.*

- Conception Bay : Buddington, 129.
Wabana district : Hayes, 437.

Petrology.

- Conception bay : Buddington, 129.

New Hampshire.*Physiographic.*

- New England peneplain in White Mountain region : Lobeck, 648.
Peneplain, position : Lobeck, 647.
White Mountains : Johnson, 521.

Stratigraphic.

- Ammonoosuc district : Lahee, 607.
Bethlehem moraine : Goldthwaite, 395.
Glaciation, White Mountains : Goldthwaite, 395.

- Lyman schists, origin : Lahee, 607.

Petrology.

- Lyman schists, origin : Lahee, 607.

New Jersey.*General.*

- Bibliography : Black, 81.
Report of State geologist for 1914 : Kummel, 603.
for 1915 : Kummel, 604.

Economic.

- Mineral industry, 1914 : Twitshell, 1099.

Stratigraphic.

- Shark River Eocene deposits, age : Harris, 429.
Silurian : Schuchert, 961.

Paleontology.

- Palm, Cretaceous : Berry, 71.

Petrology.

- Pillow lavas, Watchung Mountains : Lewis, 640.
Secondary trap rock minerals, origin : Lewis, 639.
Zeolite deposits, First Watchung Mountain, genesis : Gordon, 399.

Mineralogy.

- Cavities in First Watchung Mountain zeolite deposits : Wherry, 1195.
Manganocalcite, Franklin Furnace : Levison, 638.
Margarosanite, Franklin : Ford and Bradley, 371.
Secondary trap rock minerals, origin : Lewis, 639.
Stevensite, Essex County : Glenn, 392.
Thaumasite, Great Notch : Brown, 124.
Titanite : Wherry, 1197.
Zeolite deposits, First Watchung

New Mexico—Continued.*Economic—Continued.*

- Pinos Altos district, Grant County : Blood, 89.

- Silver City quadrangle : Paige, 824.

Physiographic.

- Explosion craters : Darton, 260.
Luna County : Darton, 258.
Navajo country : Gregory, 405.
Silver City quadrangle : Paige, 824.

Stratigraphic.

- Burro Mountains : Somers, 1023.
Luna County : Darton, 258.
Morrison formation : Mook, 776.
Navajo country : Gregory, 405.
Red beds, Rio Grande Valley, age : Case, 178.

- San Juan County : Bauer, 52 ; Knowlton, 600.

- Silver City quadrangle : Paige, 824.

- Southern New Mexico : Darton, 262.

- Table of formations : Keyes, 565.

Paleontology.

- San Juan County, flora of Fruitland and Kirtland formations : Knowlton, 600.

- nonmarine Cretaceous Invertebrata : Stanton, 1037.

- Vertebrata : Gilmore, 387.

- Sphenacodon : Williston, 1238.

Petrology.

- Burro Mountains : Somers, 1023.
Luna County : Darton, 258.

Underground water.

- Navajo country : Gregory, 405.
Silver City quadrangle : Paige, 824.

New York.*General.*

- Report of State Museum, 1915 : Clarke, 202.

- Silver Lake basin, Staten Island : Hollick, 476.

- Soils, Oneida County : Maxon *et al.*, 728.

- Orange County : Crabb, 234.

Economic.

- Albany molding sand : Newland, 790.

- Albany slip clay : Jones, 537.

- Feldspar : Watts, 1168.

- Gneiss : Newland, 789.

- Granite : Newland, 789.

- Graphite : Jones, 538.

- Marble : Newland, 789.

- Quarry materials : Newland, 789.

- Tran : Newland 790

New York—Continued.*Physiographic.*

- Adirondacks: Ailing, 10.
 Catskills, eastern, rectilinear features:
 Chadwick, 179.
 Crown Point embayment, ancient
 water levels: Barker, 37.
 Pleistocene uplift: Fairchild, 345.

Stratigraphic.

- Canton quadrangle, pre-Cambrian
 rocks: Martin, 707.
 Devonian, central New York: Smith,
 1008.
 Edwards district, Adirondack region:
 Newland, 792.
 Glacial lakes, central Adirondacks:
 Ailing, 10.
 Glaciation, Adirondacks: Ailing, 10.
 Lake Pleasant quadrangle: Miller, 766.
 Ordovician: Foerste, 365.
 Pleistocene, upper Hudson Valley:
 Fairchild, 346.
 Saratoga quadrangle, glacial: Stoller,
 1053.
 Silurian, southeastern New York:
 Schuchert, 961.

Paleontology.

- Ceraurus, Chazy: Raymond, 887.
 Eurypterida, habitat: O'Connell, 802.
 Invertebrata, Paleozoic: Ruedemann,
 930.
 Urasterella: Hudson, 496.

Petrology.

- Canton quadrangle, pre-Cambrian
 rocks: Martin, 707.
 Foliation in pre-Cambrian rocks of
 Adirondacks, origin: Miller,
 767.

Niagara Falls.

- Recession, rate of: Spencer, 1030.

Nickel.

- United States: Hess, 454.

Nitrates.

- Origin: De Kalb, 283.

Nonmetalliferous. See also under Stratigraphic.

- Homocline and monocline: Daly, 253.
 Pre-Cambrian: Schuchert, 962.

Nonographic solutions of certain stratigraphic measurements: Palmer, 830.**North Carolina.***Economic.***North Carolina—Continued.***Petrology.*

- Diorite, Chapel Hill: Smith, 1016,
 1017.

North Dakota.*Economic.*

- Lignite: Leonard, 631.

Physiographic.

- Drainage changes, western North
 Dakota: Leonard, 632.
 Pleistocene drainage changes, western
 North Dakota: Leonard, 632.

Stratigraphic.

- Drift, pre-Wisconsin: Leonard, 633.
 Pleistocene drainage changes, western
 North Dakota: Leonard, 632.

Northwest Territories.*General.*

- Coppermine country: Tyrrell, 1100.
 Tazin and Taltson rivers: Cam-
 sell, 165.

Stratigraphic.

- Devonian, MacKenzie River valley:
 Kindle, 579.

Paleontology.

- Devonian, MacKenzie River valley:
 Kindle, 579.

Nova Scotia.*Economic.*

- Barite, Cape Breton Island: Harri-
 son, 430.
 Domes: Rickard, 902.
 Gold: Rickard, 902.
 Infusorial earth deposits, Queens
 County: Faribault, 347.
 Limestones: Woodman, 1258.
 Manganese, New Ross: Kramm, 601.
 Queen and Shelburne counties: Far-
 ibault, 347.
 Scheelite: Hills, 466.

Physiographic.

- Cow Bay Beaches: McIntosh, 677.

Stratigraphic.

- Limestones: Woodman, 1258.
 Queens and Shelburne counties: Far-
 ibault, 347.
 Triassic: Powers, 857a.

Petrology.

- Triassic basalt, Cape d'Or, Nova
 Scotia: Powers and Lane, 860.

Ocala limestone, age: Harris, 428.

Ohio.*Economic.*

- Berea oil sand, Summerfield quad-

Ohio—Continued.

Dynamic and structural—Continued.

Reames Cave, central Ohio: Hills, 465.
Ripple marks in limestones: Prosser, 871.

Physiographic.

Ashtabula quadrangle, glacial shore lines: Carney, 176.
Cincinnati: Fenneman, 352.
Oberlin quadrangle, glacial lake shore lines: Carney, 175.

Stratigraphic.

Ashtabula quadrangle, glacial shore lines: Carney, 176.
Berea formation: Verwiebe, 1137.
Cincinnati: Fenneman, 352.
Cincinnati region: Shideler, 984.
Cincinnati: Braun, 107.
Detroit River series, age: Stauffer, 1038.
Devonian, Northern Ohio: Stauffer, 1040.

Dunkard series: Stauffer, 1039.
Flint Ridge: Mark, 703.
Greenfield member, carbonaceous material: Napper, 786.
Hillsboro sandstone, stratigraphic position: Prosser, 869.
Maxville limestone, north of Licking River: Lamb, 609.
outliers: Lamb, 609.

Niagaran formations, western Ohio: Prosser, 870.
Oberlin quadrangle, glacial lake shore lines: Carney, 175.

Ordovician-Silurian boundary: Shideler, 984.

Summerfield quadrangle: Condit, 222.
Woodsfield quadrangle: Condit, 223.

Paleontology.

Cincinnati types: Foerste, 367.
Coal Measures Amphibia: Moodie, 771.
Devonian, northern Ohio: Stauffer, 1040.

Eurythorax, lungfish operculum: Husakof, 506.

Hillsboro sandstone: Prosser, 869.

Lungfish remains, coal measures: Husakof, 506.

Oil. *See* Petroleum.

Oil shales.

General: Selwyn-Brown, 973.
Colorado, northwestern: De Beque, 279; Winchester, 1247.
Green River formation, Colorado, Utah and Wyoming: Winchester, 1247.
Utah, northeastern: Winchester, 1247.
Wyoming, Green River basin: Winchester, 1247.

Oklahoma.

Economic.

Cushing field, petroleum: Conkling, 226.
Foraker quadrangle: Heald, 441.
Joplin ore deposits: Bain, 26.
Mineral resources: Shannon, 976.

Oklahoma—Continued.

Economic—Continued.

Natural gas: Wegemann, 1179.
Oil and gas possibilities, Billings area, Noble County: Fath, 350.

Physiographic.

General: Hager, 420.

Stratigraphic.

Billings area, Noble County: Fath, 350.

Foraker quadrangle: Heald, 441.

Geologic map, eastern Oklahoma: Okla. G. S., 805.

Paleontology.

Carboniferous: Beede, 56.

Mineralogy.

Kaolinite, intumescent: Schaller and Bailey, 952.

Old Red Sandstone, fluviatile origin: Barrell, 39.

Ontario.

General.

Hudson Bay region: Savage, 946.
Lake Huron, north shore: Collins, 221.
London area: Stansfield, 1036.
Sutton, Barrie, and Ottawa area: Johnston, 531.

Economic.

Bureau of Mines, report, 1915: Gibson, 382.

Cobalt district: Knight, 584.

Copper, Bruce mines: Knight, 585.

Gold, Beatty-Munro area: Hopkins, 485.

Big Duck Lake: Hopkins, 484.

Boston Creek area: Burrows and Hopkins, 141, 143.

Goodfish Lake area: Burrows and Hopkins, 141.

Porcupine area: Burrows, 140.

Porcupine district, origin: Hore, 487.

Iron, magnetite ores, Haliburton County: Foye, 373.

Michipicoten ranges: Parsons, 840.

Iron pyrites southeastern Ontario: Hopkins, 486.

Kamiskotia Lake area: Burrows and Hopkins, 142.

Kingston area: Baker, 29.

Lead: Uglow, 1108, 1110.

London area: Stanchfield, 1036.

Metallogenetic epochs, pre-Cambrian: Miller and Knight, 764.

Natural gas: Knight, 586.

Nickel, Sudbury deposits, Ontario: Coleman, 216.

Northern Ontario: Livermore, 646; Stewart, 1050.

Petroleum: Knight, 586.

Road materials: Reinecke, 895, 896.

Sudbury nickel deposits: Coleman, 216.

Sudbury nickel-copper ores, origin: Corless, 230; 1281.

Thessalon area, Lake Huron: Knight, 585.

Zinc: Uglow, 1110.

Long Lake mine: Uglow, 1109.

Ontario—Continued.

Dynamic and structural.

Earthquake, February 10, 1914: Klotz, 582.

Physiographic.

Algonquin beach, Lake Simcoe district: Johnston, 532.

Stratigraphic.

Arkona: Stauffer, 1040.

Beatty-Munro area, Timiskaming area: Hopkins, 485.

Big Duck Lake area: Hopkins, 484.

Borings: Knight, 586.

Boston Creek area: Burrows and Hopkins, 141.

Detroit River series, age: Stauffer, 1038.

Glacialian, Ottawa Valley: Johnston, 533.

Glamorgan township, Haliburton County: Foye, 373.

Guelph formation: Williams, 1232.

Haliburton-Bancroft area, intrusions: Foye, 374.

Kamikotia Lake area: Burrows and Hopkins, 142.

Killarney granite: Collins, 220.

Kingston area: Baker, 29.

Ordovician: Kindle, 577.

Michipicoten iron ranges: Parsons: 840.

Ordovician: Foerste, 365.

Porcupine gold area: Burrows, 140.

Pre-Cambrian: Lawson, 620; Miller and Knight, 764.

Silurian, southwestern Ontario: Williams, 1231.

Thessalon area, Lake Huron: Knight, 585.

Paleontology.

Kingston area: Wilson and Mather, 1240.

Silurian, Patricia: Parks, 839.

Petrology.

Glamorgan township, Haliburton County: Foye, 373.

Haliburton-Bancroft area, intrusions: Foye, 374.

Porcupine district: Whitman, 1208.

Mineralogy.

Sudbury nickel ores: Coleman, 217.

Oolite.

Organic oolite, Ordovician: Van Tuyl, 1121.

Origin: Herrera, 452; Van Tuyl, 1129.

*Ordovician.**Stratigraphy.*

Arizona: Ransome, 881.

Arkansas. Eureka Springs-Harrison

Ordovician—Continued.

Stratigraphy—Continued.

Illinois, Galena-Elizabeth quadrangles: Shaw and Trowbridge, 982; Trowbridge and Shaw, 1090.

Indiana, Dearborn County: Bigney, 78.

Jefferson County: Culbertson, 239.

Iowa, Fayette County, Maquoketa beds: Slocum, 1007.

Galena quadrangle: Shaw and Trowbridge, 982.

Waukon area: Howell, 492.

Minnesota, Minneapolis-St. Paul district: Sardeson, 937.

New Mexico, Luna County: Darton, 258.

Silver City quadrangle: Paige, 824.

New York: Foerste, 365.

Lake Pleasant quadrangle: Miller, 766.

Ohio, Cincinnati region: Fenneman, 352.

Ordovician-Silurian boundary: Shideler, 984.

Ontario: Foerste, 365; Knight, 586.

Kingston area: Kindle, 577.

Pennsylvania, Chester County, Doe Run-Avondale region: Bliss and Jonas, 88.

Quebec: Foerste, 365.

Lake St. John district: Dresser, 313.

Silurian-Ordovician boundary: Shideler, 984.

Texas: Udden *et al.*, 1107.

Washington, Skykomish basin: Smith, 1022.

West Virginia, Jefferson, Berkeley, and Morgan counties: Grimsley, 416.

Wisconsin: Weldman and Schultz, 1181.

Paleontology.

Chazy: Raymond, 886.

Cincinnatian types: Foerste, 367.

Iowa, Fayette County, Maquoketa trilobites: Slocum, 1007.

Maloney series: Duror, 324.

Manitoba: Parks, 839.

New York: Foerste, 365.

Chazy group, Ceraurus: Raymond, 887.

Ontario: Foerste, 365.

Kingston area: Wilson and Mather, 1240.

Quebec: Foerste, 365.

Washington, Skykomish basin: Smith, 1022.

Ore deposits, origin. *For ore deposits in general see Economic (general).*

Ore deposits, origin—Continued.**Copper—Continued.**

Warren district, Arizona: Bonillas *et al.*, 90.

Montana, Butte: Thompson, 1077.

New Mexico: Turner, 1097.

Burro Mountains: Somers, 1023.

red beds types: Rogers, 917.

Santo Domingo, San Cristobal: Donnelly, 308.

Utah, Bingham Canyon: Atwood, 21; Beeson, 57.

Copper sulphide enrichment: Allen, 8. reactions: Zies *et al.*, 1276.

Copper-sulphide ores: Day, 275.

Garnet zones: Kemp, 562.

Gold, California, Feather River region: McLennan, 685.

Nova Scotia: Rickard, 902.

Ontario, Porcupine district: Hore, 487.

Hematite, zonal growth: Sosman and Hostetter, 1027.

Hydrothermal alteration: Stephenson, 1044.

Idaho, Cœur d'Alene: Hershey, 453.

Illinois, lead and zinc: Trowbridge and Shaw, 1090.

Intergrowth of bornite and chalcocite: Rogers, 918.

Intergrowths of minerals: Goodchild, 396.

Iron, bog ores: Dake, 247.

Cuba, Daiquiri district: Kemp, 564; Lindgren and Ross, 644.

Daiquiri and Firmeza deposits: Singewald and Miller, 1001.

eastern: Leth and Mead, 629.

Firmeza district: Roesler, 915.

Iowa, Waukon: Howell, 492.

Newfoundland, Wabana: Hayes, 437.

Ontario, magnetite ores: Foye, 373.

Michipicoten area: Parsons, 840.

residual ores, formation and distribution: Dake, 246.

Lead, Illinois, Galena-Elizabeth quadrangles: Shaw and Trowbridge, 982.

Ontario and Quebec: Uglow, 1108.

Lead and zinc, Ontario: Uglow, 1110.

Localization of values: Grout, 418.

Magmatic sulphide ores: Tolman and Rogers, 1084.

Manganese, Virginia: Hewett, 458.

Mexico, Chihuahua, Santa Eulalia district: Prescott, 864.

Montana, Boulder batholith: Billingsley, 79.

Ore deposits, origin—Continued.

Ontario, Long Lake mine: Uglow, 1109.

Sudbury nickel-copper ores: Anoa, 1281.

Ore deposition, relation to faulting: Spurr, 1035.

Ore on limestone side of garnet zones: Umpleby, 1113.

Ore segregation: Tolman and Rogers, 1084.

Ore shoots: Garrison, 380; Grout, 418.

Oxidation of manganese solutions: Lenher, 630.

Persistence of ore in depth: Rickard, 903.

Phosphate, Tennessee: Phalen, 850.

Pyrrhotitic deposits: Tolman and Rogers, 1084.

Salt deposits, Ojo de Liebre, Lower California, Mexico: Wittich, 1250.

Sericite a low temperature hydrothermal mineral: Rogers, 916.

Successive phases of mineralization: Lindgren, 642.

Sulphide intergrowths, paragenesis: Whitehead, 1204.

Sulphide ore enrichment, laboratory studies: Young and Moore, 1274.

Tin, wood, Nevada, Lander County: Knopf, 589, 591.

Utah: Loughlin, 658.

Tintic district: Crane, 236.

Zinc, Illinois, Galena-Elizabeth quadrangles: Shaw and Trowbridge, 982.

southwestern Missouri, origin: Cox *et al.*, 233.

oxidized ores, formation from sulphide: Wang, 1153.

Oregon.**General.**

Cascade Range: Williams, 1227.

Report 1915-1916, Bureau of Mines and Geology: Parks, 837.

Three Sisters region: Smith, 1021.

Economic.

Curry County: Butler and Mitchell, 147.

Gold, silver, copper, lead, and zinc in 1915: Yale, 1268.

Mining districts: Parks and Swartley, 838.

Dynamic and structural.

Glaciers, Three Sisters: Williams, 1230.

Physiographic.

Oregon—Continued.**Stratigraphic—Continued.**

Curry County: Butler and Mitchell, 147.

Dayville reservoir site: Collier, 219.

Paleontology.

Bear, Pliocene: Merriam *et al.*, 743.

Corals, Cretaceous and Tertiary: Nomland, 794.

Mammalia, Ironside: Merriam, 741.

Petrology.

Radiolarian cherts: Smith, 1020.

Ore shoots. *See* Economic geology; Ore deposits, origin.

Orogeny.

Rocky Mountains, origin and development: Blackwelder, 82.

Sierra Nevada, Tertiary-Quaternary orogenic history: Matthes, 716.

Oscillation. *See* Changes of level.

Osteogenesis, Cretaceous: Moodle, 772.

Ostracoda. *See* Crustacea.

Ozark region: Purdue and Miser, 879.

Paleobotany.

Alum Bluff flora: Berry, 65.

Angiosperms, antiquity: Sinnott, 1003.

Anomolofollicites, Dawson County, Montana: Hollick, 477.

Calvert flora: Berry, 66.

Catahoula sandstone flora: Berry, 68.

Citronelle flora: Berry, 67.

Colorado, Florissant: Knowlton, 598.
southwestern, Cretaceous: Cock-
erell, 207.

Coniferous woods, Potomac formation:
Sinnott and Bartlett, 1004.

Conifers, Rancho La Brea, California:
Knowlton, 592.

Cretaceous, upper: Berry, 72.

Cycadeoides: Wieland, 1224.

Cycads: Wieland, 1223.

Eocene, lower, floras: Berry, 63.

Epidermis, Carboniferous, Nebraska:
Whitford, 1207.

Fig, Pleistocene, Kootenay Valley:
Humphreys, 499.

Fox Hills flora: Knowlton, 597.

Fungi: Berry, 73.

Cretaceous: Whitford, 1206.

Gymnosperms, geologic history: Berry,
70.

Jurassic, Matanuska Valley, Alaska:
Knowlton, 599.

Mexico, Mixteca Alta, flora liassica:
Wieland, 1222.

Puebla, Liassic plants: Diaz Lozano,
292.

Vera Cruz, Liassic plants: Diaz Lo-
zano, 292.

Paleobotany—Continued.

Plagiozamites, coal measures, Garrett
County, Maryland: Bassler, 45.

Plant cuticles, Graneros shale: Whit-
ford, 1205.

Plants, Morrison formation: Knowl-
ton, 593.

Puccinites: Whitford, 1206.

Seed-bearing ferns: Knowlton, 595.

Salaginella, northeastern Montana:
Knowlton, 594.

Sphenozamites, San Juancito, Hon-
duras: Humphreys, 498.

Swauk series: Duror, 324.

Tennessee, Cretaceous flora: Berry, 74.

Tree stumps, Alberta: Hargreaves, 425.

Triassic, Pennsylvania: Wherry, 1198.

Triassic plants, Sonora, Mexico: Hum-
phreys, 500.

Upper Cretaceous: Berry, 69.

Washington, Skykomish basin: Smith,
1022.

Zamia, Mississippi: Berry, 75.

Paleoclimatology.

General: Sayles, 947.

Banded glacial slates of Permo-Car-
boniferous age: Sayles, 947.

Devonian: Barrell, 39.

Pacific coast: Smith, 1013.

Red beds, origin: Baker, 28.

Silurian-Devonian: Barrell, 40.

Paleogeographic maps.

California: Dickerson, 294.

Mesozoic: Schuchert, 960.

Paleogeography. *See also* Geologic history; Paleoclimatology; Paleogeographic maps.

General: Schuchert, 958.

Devonian corals, migration: Grabau,
401.

Ordovician: Raymond, 886.

Mesozoic: Schuchert, 960.

Paleometeorology. *See* Paleoclimatology.**Paleontology (general). *See also* the classes of animals and Paleobotany. For stratigraphic see the different systems. For regional see names of States. *See also* Evolution.**

General: Gidley, 383.

Bottom control of faunas: Kindle, 578.

Collecting fossils: Hudson, 495; Kin-
dle, 576.

Geochemical evidence as to early forms
of life: Clarke, 201.

Isthmus of Panama and animal life of
North and South America:

Paleozoic (undifferentiated).

Alaska, Cosna-Nowitna region: Eakin, 328.

Ruby-Koskokwim region: Mertie and Harrington, 751.

Yukon-Koyukuk region: Eakin, 327.

Panama Canal Zone.*Dynamic and structural.*

General: MacDonald, 671.

Slides, Panama Canal: Goethals, 393; MacDonald, 670, 671; Van Hise *et al.*, 1118.

mechanics: Becker, 54.

Stratigraphic.

General: MacDonald, 671.

Paragenesis of minerals.

Copper, Bonanza mines: Tolman, 1081.

Crystallographic intergrowths: Ray, 883.

Diabase, Massachusetts: Emerson, 340.

Montana, Butte: Thompson, 1077.

Sulphide intergrowths: Whitehead, 1204.

Pathology and bacteriology, Mesozoic:

Moodie, 773.

Feat.

General: Stevenson, 1048.

Canada: Anrep, 13.

Florida: Forsalith, 372.

United States: Turp, 1098.

Pelecypoda. See also Mollusca.

Arcas, Atlantic slope: Sheldon, 983.

Chazy: Raymond, 886.

Maclure, Mesozoic and Cenozoic. Pacific coast: Packard, 821.

Pele's tears: Moore, 777.

Penneplains.

Appalachian: Grimsley, 416.

Driftless area, Wisconsin - Iowa: Hughes, 497.

Mississippi Valley: Malott, 691.

New England penneplain in White Mountain region: Lobeck, 648.

West Virginia, Jefferson, Berkeley, and Morgan counties: Grimsley, 416.

Pennsylvania.*Economic.*

Anthracite coal fields, map: Alder & Co., 5.

Barite: Watson and Sharshall, 1165.

Feldspar: Watts, 1168.

Fire clay: Morganroth, 779.

Natural gas, southwestern Pennsylvania: Pa. T. G. S., 842.

Petroleum, southwestern Pennsylvania: Pa. T. G. S., 842.

Dynamic and structural.

Faulting, Hollidaysburg quadrangle: Butts, 151.

Pothole, Scranton: Eaton, 332.

Pennsylvania—Continued.*Stratigraphic—Continued.*

Reading area: Wherry, 1193.

Silurian: Schuchert, 961.

Triassic igneous rocks, Gettysburg: Stose and Lewis, 1057.

Paleontology.

Plants, Triassic: Wherry, 1198.

Petrology.

Chester County, Doe Run-Avonvale region: Bliss and Jonas, 88.

Triassic igneous rocks, Gettysburg: Stose and Lewis, 1057.

Mineralogy.

Argentine, Delaware County: Gordon, 398.

Calcite, lamellar, Delaware County: Gordon, 398.

Chester County, Brinton's quarry: McKinstry, 681.

Glauberite crystal cavities, Bucks County: Wherry, 1196.

Pennsylvanian. See Carboniferous.

Pentremites. See Blastoida.

Permian. See Carboniferous.

Permian fauna: Case, 177.

Petroleum.

General: Bacon and Hamor, 24; Dorsey, 419; Johnson and Huntley, 524; Requa, 898; Sur, 1059; Wilson, 1242.

Accumulation, diastrophic theory: Daly, 251.

Alge of petroleum-yielding shales of Green River formation: Davis, 263.

Appalachian geosyncline, deep sand possibilities, West Virginia: Reger, 893.

Capillarity, effects on oil accumulation: McCoy, 669.

Composition, relation to genesis and occurrence: Mabery, 664.

Connate water in oil and gas sands: Johnson, 523; Shaw, 979; Washburne, 1155.

Conservation: Arnold, 17.

Dakota sand, oil, gas, and water content: Huntley, 504.

Diastrophic theory of oil and gas accumulation: Daly, 251.

Geology: Clapp, 189.

Migration and separation of hydrocarbons, relation to structure: Trumbull, 1095.

Oil field waters: Rogers, 919.

Origin and accumulation: Wilson, 1242.

Alaska: Brooks, 114.

Petroleum—Continued.

Illinois, Vincennes quadrangle: Rich, 901.

Indiana: Wright, 1259.

Green County: Van Gorder, 1117.

Kentucky: Fohs, 368.

Louisiana, Caddo field: Matson, 711.

Mexico: Huntley, 503; Ordóñez, 811.

eastern: Dumble, 319.

Furbero field: DeGolyer, 281.

Ohio, Summerfield quadrangle: Condit, 222.

Woodsfield quadrangle: Condit, 223.

Oklahoma, Cushing field: Conkling, 226.

Ontario: Knight, 586.

Pennsylvania, southwestern: Pa. T. G. S., 842.

Texas: Dumble, 319.

United States: Northrop, 797, 799.

Washington: Weaver, 1170.

western: Weaver, 1176.

West Virginia, Lewis and Gilmer counties: Reger, 892.

Wyoming: Trumbull, 1096.

Basin oil field: Lupton, 659.

Big Muddy and Douglas oil and gas fields: Wyo. St. G., 1266.

Fremont County, Copper Mountain district: Trumbull, 1094.

Pilot Butte field: Ziegler, 1275.

Grass Creek field: Hintze, 469.

Little Buffalo Basin field: Hintze, 468.

Petrology (general). *See also* Igneous and volcanic rocks; Technique. *For regional see names of States. For rocks described, see list, p. 151.*

Australites: Moore, 777.

Fundamental principles: Weinschenk, 1182.

Igneous rocks, average composition: Knopf, 590.

Lithogenesis of sediments: Van Tuyl, 1125.

Neponsetose: Bascom, 44.

Pele's tears: Moore, 777.

Petrographic collection of American rocks: Clark, 192.

Recording micrometer for geometrical rock analysis: Shand, 975.

Phosphate.

General: Phalen, 849, 851.

Geologic rôle: Blackwelder, 83-85.

Alberta, Banff: Adams and Dick, 2; De Schmid, 288.

Florida, map: Fla. G. S., 364.

Mexico, Nuevo Leon, Monterrey: Flores, 361, 362.

Physiographic (general). *For regional see under the various States. See also* Drainage changes.

Contraposed shore lines, Juan de Fuca strait: Keyes, 567.

Flood plains and terraces: Fuller, 376.

Geographic cycle: Keyes, 573.

Geographical description, principles: Davis, 269.

Girdled mountain: Keyes, 571.

Mississippi, upper: Martin, 709.

Mountain glacial erosion: Hobbs, 471.

New England peneplain in White Mountain region: Lobeck, 648.

Nomenclature: Johnson, 519.

Physiographic divisions of the United States: Fenneman, 351; Matthews, 715.

Plains, planes, and peneplanes: Johnson, 519.

Regional slopes: Reinecke, 897.

St. Lawrence River, scour, and lowering of Lake Ontario: Spencer, 1032.

Subdivision of North America into natural regions: Joerg, 516.

Tillow lavas, Watchung Mountains, New Jersey: Lewis, 640.

Pintization, Conception Bay, Newfoundland: Buddington, 129.

Pisces.

Alberta, Banff, ganoid fishes: Lambe, 610.

Bibliography: Dean and Eastman, 278.

Cristivomer namaycush, Pleistocene, Wisconsin: Hussakof, 509.

Eurythorax, lungfish operculum: Hussakof, 506.

Leuciscus roseli, Miocene, British Columbia: Hussakof, 508.

Lungfish remains, coal measures: Hussakof, 500.

Palæoniscid fish, Permian, South Dakota: Hussakof, 507.

Paleozoic: Eastman, 330.

Wyoming, Embar formation: Branson, 104.

Pit and mound structures: Kindle, 580.

Placers. *See* Gold.

Plains.

Canada, northwestern: Dowling, 311.

Canadian plains, origin: Dowling, 312.

Plants, fossil. *See* Paleobotany.

Platinum.

Nevada, Goodsprings: Crampton, 235.

United States: Hill, 463.

Pleistocene. *See* Glacial geology; Quaternary.

Porto Rico.*General.*

- General: Berkey, 61.
Coamo-Guyama region: Hodge, 472.
San Juan district: Semmes, 974.

Physiographic.

- Coamo-Guyama region: Hodge, 472.

Stratigraphic.

- General: Reeds, 891.
Geologic history: Reeds, 890.

Paleontology.

- General: Reeds, 891.
Halitherium: Matthew, 722.
Isolobodon: Allen, 9.
Nesophontidae: Anthony, 14.
Octodont: Allen, 9.
Sirenian: Matthew, 722.

Potash.

- Extraction from wyomingite: Wells, 1188.
Texas: Phillips, 854.
United States: Phalen, 845.
Utah, central, alunite: Waggaman and Cullen, 1142.
Saiduro salt deposit: Gale, 378.

Potholes.

- Pennsylvania, Scranton: Eaton, 332.

Pre-Cambrian.*Stratigraphy.*

- General: Walcott, 1143.
Nomenclature: Schuchert, 962.
Arizona: Ransome, 881.
Warren district: Bonillas *et al.*, 90.
Canada: Termier, 1080.
Colorado, Colorado Springs quadrangle: Finlay, 357.
Great Lakes region: Lawson, 620.
Manitoba, Churchill River region: Alcock, 4.
northern: Bruce, 126.
Michigan, Keweenaw region: Lane, 613.
Minnesota, Mesabi Iron range: Wolff, 1253.
Montana, Helena: Walcott, 1146.
Three Forks region: Haynes, 440.
New York Adirondack region: Miller, 767.
Canton quadrangle: Martin, 707.
Lake Pleasant quadrangle: Miller, 766.
New Mexico, Burro Mountains: Somers, 1023.
Luna County: Darton, 258.
Silver City quadrangle: Paige, 824.
Northwestern Territories, Tazin and Taltson rivers: Cammell, 165.
Ontario: Miller and Knight, 764.
Beatty-Munro area: Hopkins, 485.
Boston Creek area: Burrows and Hopkins, 141.
Goodfish Lake area: Burrows and Hopkins, 141.
Kingston area: Baker, 29.
Lake Huron region: Collins, 220.
Michipicoten area: Parsons, 840.
Porcupine area: Burrows, 140.

Pre-Cambrian--Continued.*Stratigraphy--Continued.*

- Ontario, Thessalon area: Knight, 585.
Pennsylvania, Chester County: Doe Run-Avondale region: Bliss and Jonas, 88.
Quebec, Beauce County: Tyrrell, 1102.
Buckingham area: Wilson, 1243.
Lake St. John district: Dresser, 313.
Portneuf County: Bancroft, 32.
Saskatchewan, northern: Bruce, 126.
Utah, Promontory district: Butler and Helkes, 146.
Vermont, Algonkian: Dale, 248.
Wisconsin: Weldman and Schultz, 1181.
northwestern: Hotchkiss *et al.*, 489.

Paleontology.

- General: Walcott, 1143.

Precious stones. *See also* Diamonds; Sapphires; Turquoise.

- Mexico, Lower California: Wittich, 1251.
United States: Schaller, 951.

Primates. *See* Mammalia.**Protractor, geological:** Wright, 1260.**Pseudomorpha.**

- Glauberite casts: Wherry, 1196.
Limonite after diabantite: Emerson, 340.

Pteranodon: Matthew, 724.**Pyrite.**

- Ontario, southeastern: Hopkins, 486.
United States: Phalen, 848.

Pyrophyllitization, Conception Bay, Newfoundland: Buddington, 129.**Quaternary.** *See also* Glacial geology.*Stratigraphy.*

- General.
Extinct lakes: Shaw, 978.
Alaska, Yukon-Koyukuk region: Eakin, 327.
Arkansas, northeastern: Stephenson and Crider, 1047.
British Columbia, Savona: Drysdale, 316.
Georgia, Coastal Plain: Brantley, 105.
Iowa, Des Moines, Capitol Hill, Pleistocene: Lees, 625.
Montana, eastern: Rowe and Wilson, 925.
New Mexico, Luna County: Darton, 258.
Oregon, Columbia River gorge region: Williams, 1228.
Saskatchewan, Wood Mountain-Willowbunch area: Rose, 922.
Texas: Udden *et al.*, 1107.
Lasalle and McMullen counties: Deussen and Dole, 289.
Utah, Castle Valley: Lupton, 660.
Wisconsin, Dunn Co.: Hussakof, 509.
Paleontology.
Arkansas, Crowley's Ridge: Shimek, 985.

Quaternary—Continued.**Stratigraphy—Continued.**

- Florida, Pleistocene: Sellards, 968.
 Vertebrata: Hay, 435.
 Vertebrata: Sellards, 967.
 Maine, Mt. Desert Island, Pleistocene:
 Blaney and Loomis, 87.
 Missouri, Callaway County, Pleisto-
 cene Mollusca: Greger, 403.
 Pleistocene Mammalia: Hay, 434.
 Texas, Pleistocene, Xenarthra: Hay,
 436.
 Wisconsin, Cristivomer: Hussakof,
 509.

Quebec.**General.**

- Harricaw basin: Tanton, 1066.
 Lake St. John district: Dresser, 313,
 314.
 Northwestern Quebec, Broadback and
 Nottaway rivers: Cooke, 228.
 Thetford-Black Lake area: Harvie,
 431.

Economic.

- Buckingham map area: Wilson, 1243.
 Copper, Weedon, Wolf County,
 Adams 3.
 Gold, Beauce County: Tyrrell, 1102.
 Graphite Amherst: Cirkel 187.
 Iron: Dulleux 318.
 Lake St. John district: Dresser 313.
 Lead: Uglow, 1108, 1110.
 Portneuf County: Bancroft, 32.
 Mining operations, 1915: Dufresne,
 317.
 Portneuf County, Montauban region:
 Bancroft, 32.
 Road materials: Reinecke, 896.
 Templeton district: Ledoux, 621.
 Thetford-Black Lake area: Harvie,
 431.

Zinc: Uglow, 1110.**Portneuf County: Bancroft, 32.****Stratigraphic.**

- Beauce County: Tyrrell, 1102.
 Buckingham map area: Wilson, 1243.
 Chazy: Raymond, 886.
 Glaciation, Ottawa Valley: Johnston,
 533.
 Lake St. John district: Dresser, 313,
 314.

Ordovician: Foerste, 365.**Portneuf County, Montauban region:
Bancroft, 32.****Paleontology.****Beluga, Leda clay, Montreal East:
Ardley, 16.****Camerozostites: Foerste, 366.****Petrology.****Portneuf County, Montauban region:
Bancroft, 32.****Radium.**

- Colorado: Alsdorf, 11.
 Uraninite, Colorado: Pearce, 841.
 United States: Hess, 454.

Raindrops, fossil: Kindle, 580.**Rare earths.****General: Pratt, 861.****Red beds, origin: Baker, 28; Tomlinson,
1086.****Regional slopes: Reinecke, 897.****Reptilia.**

- Apatosaurus, Utah: Holland, 474, 475.
 Caimanoides visleri, South Dakota:
 Mehl, 732.

**Camarasaurus and Morosaurus, iden-
tity: Osborn, 817.****Corythosaurus, skeleton, musculature,
and epidermis: Brown, 122.****Dinosaur, pathological lesion: Moodle,
774.****Dinosaurs: Matthew, 718.****Diplodocus: Holland, 475.****Florida: Hay, 435.****Morrison fauna: Mook, 776.****Ojo Alamo, Kirtland, and Fruitland
faunas, San Juan Basin: Gil-
more, 387.****Ornitholestes, Struthiomimus, Tyran-
nosaurus: Osborn, 815.****Ornithomimus: Osborn, 816.****Osteogenesis, Cretaceous: Moodle, 772.****Peiyosaurus: Watson, 1161.****Permian vertebrates, osteology: Wil-
liston, 1235.****Podokesaurus, restoration: Shufeldt,
995.****Prosaurolophus, Red Deer River:
Brown, 121.****Pteranodon: Matthew, 724.****Sphenacodon, New Mexico: Williston,
1238.****Sternum, origin: Williston, 1239.****Testudo hayi, Florida: Sellards, 970.****Tetrapoda, Permian: Williston, 1236.
structure of brain case: Watson,
1160.****Thalattosaurus, skull: Merriam and
Camp, 742.****Tomistoma americana, Florida: Sell-
ards, 970.****Triassic: Wiman, 1246.****Turtles, Lance formation, Wyoming:
Gilmore, 385.****Uta formation: Gilmore, 386.****Tyrannosaurus: Brown, 120; Osborn,
816.****Utah, tortoise, Jurassic: Gilmore, 384.****Restorations.**

Restorations—Continued.

Podokesaurus holyokensis: Shufeldt, 995.

Pteranodon: Matthew, 724.

Sphenacodon, New Mexico: Williston, 1238.

Struthiomimus: Osborn, 815.

Tiger, sabre-toothed: Matthew, 726.

Tyrannosaurus: Osborn, 815.

Rhode Island.*General.*

Miocene boulders, fossiliferous, Block Island: Shimer, 988.

Mineralogy.

Calcite, lamellar: Hawkins, 438.

Ripple marks.

General: Bucher, 128; Cox and Dake, 232; Udden, 1106.

Formation: Johnson, 520.

Limestone, Ohio: Prosser, 871.

Rivers.

St. Lawrence River, scour, and lowering of Lake Ontario: Spencer, 1032.

Road materials.

Composition and structure: Lord, 651.

Ontario: Reinecke, 895, 896.

Quebec: Reinecke, 896.

Rock slides. See Landslides.**Rocks, structural features. See also Ripple marks.**

General: Cox and Dake, 232.

Australites: Moore, 777.

Basalt, 1057.

Breccia in St. Louis limestone, origin: Morse, 781.

Brecciation, St. Louis limestone: Van Tuyl, 1122.

Foliation in pre-Cambrian rocks of Adirondacks, origin: Miller, 767.

Intraformational breccias, origin and classification: Field, 356.

Louisiana, Shreveport, intraformational conglomerate and breccia: Emerson, 341.

Paleozoic limestones reef deposits: Brown, 125.

Rocks described. See list, p. 151.

Ruby-Kuskokwim region, Alaska: Mertie and Harrington, 751.

Salines, Louisiana and Texas, origin: Harris, 427; Norton, 801.

Salt.

United States: Phalen, 847.

Salton Sea: MacDougal *et al.*, 674.

Salvador.

General: Fleury, 360.

Sand. See also Glass sand; Silica.

Mineralogical analysis: Tomlinson, 1085.

New York, Albany molding sand: Newland, 790.

United States: Stone, 1055.

Sandstone dikes.

Colorado, Colorado Springs quadrangle: Finlay, 357.

San Juan Mountains, geographic history: Atwood and Mather, 23.

Santo Domingo.*Economic.*

Copper, San Cristobal: Donnelly, 306.

Saskatchewan.*General.*

Amisk-Athapapuskow & Lake area: Bruce, 127.

Economic.

Amisk-Athapapuskow Lake area: Bruce, 127.

Athabasca Lake, north shore: Camsell, 167.

Coal: Dowling, 307.

Wood Mountain-Willowbunch area: Rose, 922.

Gold, northern Saskatchewan: Bruce, 126.

Wood Mountain-Willowbunch area: Rose, 922.

Physiographic.

Wood Mountain-Willowbunch area: 922.

Stratigraphic.

Amisk-Athapapuskow Lake area: Bruce, 127.

Athabasca Lake, north shore: Camsell, 167.

Northern Saskatchewan: Bruce, 126.

Wood Mountain-Willowbunch area: Rose, 922.

Seasons, Permo-Carboniferous: Sayles, 947.

Sedimentary rocks.

Arkose deposits, types of: Barton, 43.

Coal: Jeffrey, 512.

Connate water in oil and gas sands: Shaw, 979.

Criteria for determining position: Cox and Dake, 232.

Dolomite, origin: Van Tuyl, 1123.

Lithogenesis of sediments: Van Tuyl, 1125.

Maryland, Upper Cretaceous: Goldman, 394.

Old Red Sandstone, fluvial origin: Barrell, 39.

Paleozoic limestones reef deposits: Brown, 125.

Petrology: Mook, 776.

Red beds: Knight, 587.

origin: Tomlinson, 1086.

Sedimentation. See also Conglomerates; Erosion.

General: Mook, 776.

California, San Francisco Bay: Sumner *et al.*, 1058.

Gulf coast, different types of sedimentation: Shaw, 981.

Seismology. See also Earthquakes.

Earthquake intensity scales: Montesus de Ballore, 770.

Seismology—Continued.

Earthquake problem, western United States: Wood, 1256.
Tables: Klotz, 583.

Selenium.

United States: Hess, 455.

Shale.

Ohio, Cleveland area: Van Horn, 1119.

Shore lines. See also Beaches; Terraces.

Ohio, Ashtabula quadrangle: Carney, 176.
Oberlin quadrangle: Carney, 175.
Wisconsin: Martin, 708.

Silica.

United States: Katz, 548.

Silicification, Conception Bay, Newfoundland: Buddington, 129.

Silurian.

Stratigraphy.

General.

Correlation: Prosser, 870; Savage, 944.
Ordovician-Silurian boundary: Shideler, 984.
Alexandrian rocks, northeastern Illinois, and eastern Wisconsin: Savage, 944.
Edgewood limestone, Pike County, Missouri: Rowley, 926.
Hillsboro sandstone, Ohio: Prosser, 869.
Illinois, Galena-Elizabeth quadrangles: Shaw and Trowbridge, 982; Trowbridge and Shaw, 1090.
Indiana, Jefferson County: Culbertson, 239.
Iowa, Dubuque County, Clinton formation: Howell, 491.
Maryland: Swarts and Prouty, 1060.
New Jersey: Schuchert, 961.
New Mexico, Luna County: Darton, 258.
Silver City quadrangle: Paige, 824.
New York, southeastern: Schuchert, 961.
Ohio, Hillsboro sandstone: Prosser, 869.
Ordovician-Silurian boundary: Shideler, 984.
western, Niagaran: Prosser, 870.
Ontario: Knight, 586.
Guelph formation: Williams, 1232.
southwestern: Williams, 1231.
Pennsylvania: Schuchert, 961.
Texas: Udden *et al.*, 1107.
West Virginia, Jefferson, Berkeley, and Morgan counties: Grimsley, 416.
Wisconsin: Weldman and Schultz, 1181.

Paleontology.

Alexandrian epoch, Mississippi Valley: Savage, 944.
Hillsboro sandstone, Ohio: Prosser, 869.

Silurian—Continued.

Paleontology—Continued.

Iowa, Monticello, Crinoida: Thomas, 1073.
Niagaran Cephalopoda: Thomas, 1074.
Maine, Washington County, Spirifer: Williams, 1225.
Ontario, Patricia: Parks, 839.
Wisconsin, trilobites: Raymond, 884.

Silver.

General: Lindgren, 643.
Ores, classification: Fulton, 377.
Alaska: Brooks, 119.
Arizona: Heikes, 443.
British Columbia, Ainsworth district: Schofield, 954.
California and Oregon: Yale, 1268.
Central States: Dunlop and Butler, 323.
Colorado: Henderson, 449.
Gilpin County: Bastin and Hill, 51.
Eastern States: Hill, 462.
Idaho: Gerry, 381.
Montana: Heikes, 444.
Nevada: Heikes, 445.
New Mexico: Henderson, 448.
Grant County, Pinos Altos District: Blood, 89.
South Dakota: Henderson, 447.
Texas: Henderson, 448.
United States: McCaskey, 666.
Utah: Heikes, 442.
Washington: Gerry, 381.
Wyoming: Henderson, 447.
Yukon, Wheaton district: Cairnes, 159.
Silver City folio (no. 199): Paige, 824.

Slate.

United States: Loughlin, 655.

Slides. See Landslides.

Soapstone.

United States: Diller, 303.

Solia.

General.

Relation to geology: Marbut, 702.
Indiana, Fountain County: Orahood, 809.
Grant County: Hurst *et al.*, 505.
Starke County: Grimes *et al.*, 415.
Wells County: Tharp and Wiley, 1071.
White County: Bushnell and Erni, 144.
New York, Oneida County: Maxon, *et al.*, 728.
United States: Whitney *et al.*, 1210, 1211.
West Virginia, Raleigh County: Latimer, 619.

South Carolina.

Economic.

Barite: Watson and Sharshall, 1165.
Gold, Walhalla district: Peterson and Flynn, 843.
Kaolin, Aiken district: Sproat, 1034.
Limestone: Calhoun, 160.
Marl: Calhoun, 160.

South Carolina—Continued.*Economic—Continued.*

Walhalla district: Peterson and Flynn, 843.

Physiographic.

Isle of Palms: Randolph, 880.

Paleontology.

Arcas: Sheldon, 983.

South Dakota.*Economic.*

Black Hills, northern: O'Harra, 804.
Gold, silver, copper, lead, in 1915: Henderson, 447.

Lignite field, northwestern South Dakota: Winchester *et al.*, 1248.
Tungsten: Runner, 934.

Dynamic and structural.

Black Hills, pre-Cambrian structure: Paige, 826.

Mechanics of intrusion, Black Hills, pre-Cambrian granite: Paige, 825.

Pre-Cambrian granite of Black Hills, mechanics of intrusion: Paige, 825.

Stratigraphic.

Black Hills, northern: O'Harra, 804.
pre-Cambrian structure: Paige, 826.
Oak Creek formation: Troxell, 1093.
Lignite field, northwestern South Dakota: Winchester *et al.*, 1248.

Paleontology.

Calmanoides visleri, Oligocene: Mehl, 732.

Cycadeoidea, Black Hills: Wieland, 1224.

Palaeoniscid fish, Permian: Hussakof, 507.

Pliohippus: Troxell, 1091.

Pliohippus lillianus, Mission: Troxell, 1093.

Titanotheres, Oligocene: Osborn, 814.

Spherulites.

California, Little Lake: Wright, 1262.

Stone.

United States: Loughlin, 657.

Stratigraphic (general). *For regional see names of States. See also the different systems.**Correlation.*

General: Keyes, 565.

Fossils: Ulrich, 1111.

Paleogeography: Schuchert, 960.

Plants, fossil: Knowlton, 596.

Strand line displacements: Ulrich, 1111.

Vertebrates, fossil: Matthew, 725.

Arkansas-Oklahoma: Purdue and Miser, 879.

Berea formations: Verwiebe, 1137.

California, middle and northern, Pliocene: Martin, 704.

Tejon group: Dickerson, 294.

Catahoula sandstone: Matson, 714.

Chouteau limestone, terranall affinities: Keyes, 568.

Stratigraphic (general)—Continued.*Correlation—Continued.*

Cincinnatian: Braun, 107.

Cretaceous: Dowling, 308; Schuchert, 959.

Alberta and Montana: Dowling, 309.

Atlantic Coast: Clark *et al.*, 198.

Coastal Plain: Stephenson, 1045.

Upper: Berry, 69; Clark *et al.*, 197.

Atlantic and Gulf Coastal Plain: Stephenson, 1045.

Wyoming: Bowen, 93; Hares, 423;

Lupton, 661; Wegemann, 1180.

Devonian, northern Ohio: Stauffer, 1040.

Idaho, southeastern: Mansfield and Roundy, 698.

Maryland, Upper Cretaceous: Clark *et al.*, 197.

Mississippian: Butts, 150.

Morrison formation, age: Mook, 776.

Pre-Cambrian: Lawson, 620.

Rocky Mountain region: Hares, 424.

Silurian: Prosser, 870; Savage, 944.

Triassic: Martin, 705.

Tables of formations.

Alberta, oil fields: Dowling, 308.

southern: Slipper, 1006.

southwestern: Stewart, 1051.

Arizona, Navajo Country: Gregory, 405.

Arkansas, northeastern: Stephenson and Crider, 1047.

British Columbia, Bridge River area: Drysdale, 316.

Flathead area: MacKenzie, 678.

Graham Island: MacKenzie, 679.

Highland Valley copper camp: Drysdale, 316.

Coastal Plain: Clark, 195.

Cretaceous, Atlantic Coast: Clark *et al.*, 198.

Upper: Clark *et al.*, 197.

Gulf Coastal Plain: Matson, 714.

Pleistocene and Tertiary: Matson, 713.

Idaho, Fort Hall Indian Reservation: Mansfield, 693.

southeastern: Mansfield and Roundy, 698.

Iowa, Waukon area: Howell, 492.

Kansas: Keyes, 565.

Louisiana, Caddo oil and gas field: Matson, 711.

Manitoba, Churchill River region: Alcock, 4.

Pembina Mountain: MacLean, 682.

Missouri: Keyes, 565.

Montana, eastern: Rowe and Wilson, 925.

north-central: Stebinger, 1042.

New Brunswick, Cambrian: Matthew, 717.

New Mexico: Keyes, 565.

Luna County: Darton, 258.

Navajo country: Gregory, 405.

San Juan County: Bauer, 52.

Stratigraphie (general)—Continued.**Tables of formations—Continued.**

Ohio, Cincinnati region: Fenneman, 352.

western, Niagara: Prosser, 870.

Ontario, Kingston area: Baker, 29; Kindle, 577.

Lake Huron region: Collins, 220.

Pennsylvania, Chester County, Doe Run-Avonddale region: Bliss and Jonas, 88.

Pre-Cambrian: Lawson, 620.

Quebec, Lake St. John district: Dresser, 313.

South Dakota, northwestern: Winchester *et al.*, 1248.

Texas, Lasalle and McMullen counties: Denssen and Dole, 289.

Triassic: Martin, 795.

Alaska: Martin, 705.

Utah, Castle Valley: Lupton, 660.

Wisconsin: Weldman and Schultz, 1181.

Wyoming, Bighorn basin: Lupton, 659. Fremont County, Copper Mountain district: Trumbull, 1094.

Wind River basin: Ziegler, 1275.

Yukon, Wheaton district: Cairnes, 159.

Strontium.

General: Culin, 244.

United States: Hill, 464.

Stromatolites: Foye, 374.

Stromatoporoides.

Structure and classification: Heinrich, 446.

Study and teaching. *See* Educational.

Stylolites.

Colorado, Breckenridge, in quartzite: Tarr, 1067.

Subsidence. *See* Changes of level.

Subterranean water. *See* Underground water.

Sulphur.

United States: Phalen, 848.

Summation of chemical analyses of igneous rocks: Robinson, 912.

Surveys.

General.

Organization and cost: White, 1200.

Canada, summary report, 1915: McConnell, 668.

Florida, report of State geologist: Sellards, 965.

Illinois, report of State geologist: De Wolf, 291.

Iowa, report of State geologist, 1914: Kay, 552.

New Jersey, State geologist's report for 1914: Kummel, 603.

for 1915: Kummel, 604.

Oregon, Bureau of Mines and Geology, report 1915-1916: Parks, 837.

United States Geological Survey, report, 1915-1916: Smith, 1011.

Surveys—Continued.

Virginia, report State geologist, 1914-15: Watson, 1162.

Washington: Wash. G. S., 1157.

Synclinalorium, Great Plains region: Keyes, 566.

Tables. *See* Stratigraphic, Tables of formations.

Talc.

United States: Diller, 303.

Technique.

Attachment for metallographic microscope: Brokaw, 112.

Collecting fossils: Kindle, 576.

Field geology: Lahee, 606.

Mineralogical analysis of sand: Tomlinson, 1085.

Nomographic solutions of certain stratigraphic measurements: Palmer, 830.

Power chisel: Morse, 783.

Protractor, geological: Wright, 1260.

Recording micrometer for geometrical rock analysis: Shand, 975.

Temperature measurement in bore holes: Johnston and Adams, 527.

Tellurium.

United States: Hess, 455.

Temperature measurement in bore holes: Johnston and Adams, 527.

Tennessee.**Economic.**

Barite: Watson and Sharshall, 1165.

Coal, northern field: Glenn, 390.

southern field: Nelson, 787.

Dolomite, Johnson County: Jenkins, 514.

Manganese: Watkins, 1159.

eastern Tennessee: Purdue, 878.

Oil and gas conditions, central basin: Purdue, 876.

Reelfoot Lake district: Purdue, 877.

Phosphate: Phalen, 850.

Johnson County: Jenkins, 514.

Stratigraphic.

Central basin: Purdue, 876.

Cumberland County, southern part: Butts, 149.

Eocene: Berry, 63.

Geologic map: Jenkins, 513.

Johnson County: Jenkins, 514.

Northern coal field: Glenn, 390.

Reelfoot Lake district: Purdue, 877.

Southern coal field: Nelson, 787.

Paleontology.

Eocene: Berry, 63.

Plantæ, Cretaceous: Berry, 74.

Mineralogy.

Loretto, Loretto: Wells and Larsen, 1189.

Meteorites, Cookeville, Putnam County: Merrill, 748.

Pallomelanite: Wherry, 1197.

Terraces. See also Beaches; Shore lines.

California, Yolo County, Cache Creek area: Durst, 325.

Illinois, Galena and Elizabeth quadrangles: Trowbridge and Shaw, 1090.

Iowa, Des Moines Valley: Lees, 624.
Des Moines region: Tilton, 1079.

Tertiary.**Stratigraphic.**

Alaska, Chisana-White River district: Japps, 170.

Yukon-Koyukuk region: Eakin, 327.

Alberta, southern: Slipper, 1006.

southwestern: Stewart, 1051.

Alum Bluff formation: Berry, 65.

Arkansas, northeastern: Stephenson and Crider, 1047.

British Columbia, Flathead area: MacKenzie, 678.

Graham Island: MacKenzie, 679.

southwestern: Tyrrell, 1104.

California, Chanac formation: Merriam, 740.

Coalinga region: Nomland, 795.

Cuyama Valley: English, 344.

middle and northern, Pliocene: Martin, 704.

Pliocene, Jacalitos Creek: Nomland, 796.

Tehachapi region: Buwalda, 152.

Tejon group: Dickerson, 294.

Calvert formation: Berry, 66.

Catahoula sandstone: Matson, 714.

Citronelle formation: Matson, 713.

Colorado, Colorado Springs quadrangle: Finlay, 357.

Gilpin County: Bastin and Hill, 51.

northwestern: Winchester, 1247.

Eocene, southeastern North America: Berry, 63.

Florida: Sellards, 967.

Walton County, Choctawhatchee marl: Mansfield, 701.

Georgia, Coastal Plain: Brantley, 105.

Flint River, Oligocene: Dall, 250.

Green River formation, Colorado, Utah and Wyoming: Winchester, 1247.

Idaho, Boise Basin: Jones, 536.

Louisiana, Caddo oil and gas field: Matson, 711.

Mexico, eastern: DeGolyer, 282; Dumble, 319.

Furber field: DeGolyer, 281.

Hidalgo, Tulancingo: Gálvez, 379.

northeastern, Tuxpam beds, age: Dumble, 320.

oil fields: Huntley, 503.

Miocene boulders, fossiliferous, Block Island: Shimer, 988.

Mississippi, Vicksburg-Jackson area: Hopkins, 483.

Montana, Boulder batholith: Billingsley, 79.

eastern: Rowe and Wilson, 925.

Stillwater basin: Calvert, 163.

Tertiary—Continued.**Stratigraphic—Continued.**

Montana, Teton County, Stebinger, 1041.

Three Forks region: Haynes, 440.

Nevada, Cedar Mountain region: Merriam, 737.

New Jersey, Shark River deposits: Harris, 429.

New Mexico, Luna County: Darton, 258.

San Juan County: Bauer, 52.

Silver City quadrangle: Paige, 824.

Ocala limestone, age: Cooke, 227; Harris, 428.

Oregon, Clarno dam site: Williams, 1229.

Columbia River basin: Collier, 218.

Columbia River gorge region: Williams, 1228.

Curry County: Butler and Mitchell, 147.

Dayville reservoir site: Collier, 219.

Panama Canal Zone: MacDonald, 671.

Porto Rico: Reeds, 890, 891.

Saskatchewan, Wood Mountain-Willowbunch area: Rose, 922.

Shark River Eocene deposits, age: Harris, 429.

South Dakota, northwestern: Winchester *et al.*, 1248.

Texas: Dumble, 319; Udden *et al.*, 1107.

Dallas region: Matson, 712.

Lasalle and McMullen counties: Deussen and Dole, 389.

Tuxpam beds, age: Dumble, 320.

Utah, Castle Valley: Lupton, 660.

central: Robinson, 913.

northeastern: Winchester, 1247.

Washington, Cowlitz River valley, Eocene: Weaver, 1171.

Kitsap County, Oligocene: Weaver, 1173.

Olympic Peninsula: Weaver, 1169.

Skykomish basin: Smith, 1022.

western: Weaver, 1174, 1176.
post-Eocene formations: Weaver, 1172.

Wyoming, Bighorn basin: Lupton, 659.
central: Hares, 424.

Green River basin: Winchester, 1247.

North Laramie Mountains: Spencer, 1028.

Salt River Range: Mansfield, 694.

Wind River basin: Ziegler, 1275.

Paleontology.

Alum Bluff flora: Berry, 65.

Anomalofilicites, Dawson County, Montana: Hollick, 477.

Arcas, Atlantic slope: Sheldon, 983.

British Columbia, Miocene, Leuciscus rosei: Hussakof, 508.

California, Chanac formation: Merriam, 740.

Coalinga region: Nomland, 795.

Los Angeles, Fernando fauna: Moody, 775.

Tertiary—Continued.

Paleontology—Continued.

California, middle and northern, Pliocene: Martin, 704.

Pliocene, Jacalitos Creek: Nomland, 796.

San Jose region, Mollusca: Hall and Ambrose, 421.

Tehachapi region: Buwalda, 152.

Tejon fauna: Dickerson, 294.

Tejon Hills, marine faunas: Clark, 190.

Calvert flora: Berry, 66.

Catahoula sandstone flora: Berry, 68.

Colorado, Florissant: Knowlton, 598.

Coleoptera: Wickham,

Elatæridæ: Wickham, 1221.

Corals, California and Oregon: Nomland, 794.

Eocene, lower, floras: Berry, 63.

Florida, Vertebrata: Sellards, 967.

Walton County, Choctawhatchee marl: Mansfield, 701.

Georgia, Flint River, Oligocene: Dall, 250.

Mammalia: Cope and Matthew, 229.

Nevada, Cedar Mountain region, Vertebrata: Merriam, 737.

North Carolina, Miocene: Olsson, 807.

Sirenian, Porto Rico: Matthew, 722.

South Dakota, Calmanoides visleri: Mehl, 732.

Swauk series: Duror, 324.

Utah, Uinta formation, turtles: Gilmore, 386.

Virginia, Miocene: Olson, 807.

Washington, Cowlitz River valley, Eocene: Weaver, 1171.

Kitsap County, Oligocene: Weaver, 1173.

western: Weaver, 1174, 1176.

post-Eocene formations: Weaver, 1172.

Texas.

Economic.

General: Udden *et al.*, 1107.

Caddo oil and gas field: Matson, 711.

Mineral production: Henderson, 448.

Natural gas, Mexia-Grosbeck field: Matson, 712.

north Texas: Shaw, 980.

Petroleum: Dumble, 319.

Petrolia gas and oil field: Shaw, 980.

Potash: Phillips, 854.

Saltines, origin: Harris, 427; Norton, 801.

Physiographic.

General: Udden *et al.*, 1107.

Stratigraphic.

General: Udden *et al.*, 1107.

Texas—Continued.

Paleontology.

Catahoula sandstone flora: Berry, 68.
Echinoidea, Buda limestone: Whitney, 1209.

Eocene: Berry, 63.

Myristica, Trinity County: Berry, 76.

Permian vertebrates, osteology: Williston, 1235.

Trimerorhachis, Seymour: Williston, 1237.

Xenarthra (Edentata), Pleistocene: Hay, 436.

Mineralogy.

Alunite: Wherry, 1197.

Underground water.

Lasalle and McMullen counties: Deussen and Dole, 289.

Textbooks.

Elementary geology: Branner, 101.

Field geology: Lahee, 606.

Geology: Cleland, 204.

Historical geology: Miller, 765.

Mineralogy: Dana, 257.

Optical mineralogy: Edwards, 333.

Syllabus of lectures on field geology: Keyes, 574.

Tin.

California, San Diego County: Schaller, 949.

Nevada, northern, wood tin: Knopf, 591.

United States: Hess, 454.

Titanium.

United States: Hess, 454.

Tolovana district, Alaska: Brooks, 116.

Trap.

New York, Newland, 789.

Trap rock minerals, origin: Lewis, 689.

Triassic.

Stratigraphy.

General: Wiman, 1246.

Alaska: Martin, 705.

Chitina Valley: Moffit, 769.

British Columbia, Flathead area: MacKenzie, 678.

Idaho, Fort Hall Indian Reservation: Mansfield, 693.

Newark group: Powers, 857a.

Newark series, Philadelphia district, terrestrial origin: Morningstar, 780.

New Brunswick: Powers, 857a.

New Mexico, Luna County: Darton, 258.

Nova Scotia: Powers, 857a.

Pennsylvania, Gettysburg, igneous:

Stose and Lewis, 1057.

Texas: Udden *et al.*, 1107.

Triassic—Continued.**Stratigraphy—Continued.**

Wyoming, North Laramie Mountains:
Spencer, 1028.

Salt River Range: Mansfield, 694.

Paleontology.

Alberta, Banff, ganoid fishes: Lambe,
610.

Pennsylvania, Plants: Wherry, 1198.

Trilobita.

British Columbia, Mt. Bosworth, middle Cambrian: Burling, 138.

Cambrian: Walcott, 1144, 1145, 1147.

Ceraurus, Chazy group, New York:
Raymond, 887.

Cheirurinae, revision: Barton, 42.

Cryptolithus, cephalic suture lines:
Ruedemann, 933.

Illenidae: Raymond, 884.

Iowa, Fayette County, Maquoketa
beds: Slocum, 1007.

Median eye: Ruedemann, 929, 932.

Mesonacidae: Burling, 135.

rudimentary posterior segments:
Burling, 138.

Odontopleuridae: Raymond, 885.

Pædumias: Burling, 135.

Plethopeltis: Field, 355.

Wisconsin, Silurian: Raymond, 884.

Tungsten.

General: Fleck, 359; Rubel, 927.

Geology: Runner, 934.

Arizona: Rubel, 927; Taft, 1065;
Willis, 1233.

California, Kern County: Storms,
1056.

Randsburg district: Nevius, 788.

southern: McDonald, 673.

Colorado, Boulder County: Kirk, 581;
Leslie, 635; Wolf and Barbour,
1252.

Leadville: Fitch and Loughlin, 358.

Nova Scotia: Hills, 466.

South Dakota: Runner, 934.

United States: Hess, 454.

Turnagain-Knik region, Alaska: Capps, 171.

Turtles. *See* Reptilia.

Unconformities.

General: Ulrich, 1111.

Cambrian-pre-Cambrian: Walcott, 1146.

Underground water (general). *See also*
Geysers; Mineral waters;
Springs; Thermal waters. *For*
regional see names of States.

Connate water in oil and gas sands:
Johnson, 523; Shaw, 979.

Uranium.

General: Fleck, 359.

United States: Hess, 454.

Ungulata. *See* Mammalia.

Upper Silurian. *See* Silurian.

Utah.**Economic.**

Alunite, central Utah: Waggaman
and Cullen, 1142.

Utah—Continued.**Economic—Continued.**

Bingham Canyon, physiographic conditions at time of copper enrichment: Atwood, 21.

Castle Valley: Lupton, 660.

Coal: Watts, 1166, 1167.

Castle Valley: Lupton, 660.

Copper, Bingham Canyon: Atwood, 21;
Beeson, 57.

Promontory district: Butler and
Helkes, 146.

Cottonwood districts: Howard, 490.

Garnet deposits, Navajo Reservation:
Gregory, 406.

Lead, Promontory district: Butler
and Helkes, 146.

Mineral production, 1915: Helkes, 442.

Oil shale, northeastern Utah: Winchester, 1247.

Ore genesis, Cottonwood-American
Fork and Tintic districts:
Loughlin, 653.

Ozokerite, central Utah: Robinson, 913.

Potash, Salduro salt deposit: Gale,
378.

Promontory district: Butler and
Helkes, 146.

Tintic district: Crane, 236.

Zinc, Boxelder County: Jessup, 515.

Promontory district: Butler and
Helkes, 146.

Dynamic and structural.

Faulting, Tintic district: Loughlin,
654.

Physiographic.

Bingham Canyon, physiographic conditions at time of copper enrichment: Atwood, 21.

Castle Valley: Lupton, 660.

Stratigraphic.

Castle Valley: Lupton, 660.

Cottonwood districts: Howard, 490.

Morrison formation: Mook, 776.

Navajo country: Gregory, 405.

Ozokerite field, central Utah: Robinson, 913.

Promontory district: Butler and
Helkes, 146.

Tintic district: Crane, 236.

Paleontology.

Algae of petroleum-yielding shales of
Green River formation: Davis,
263, 264.

Apatosaurus, Jensen: Holland, 474.

Tortoise, Jurassic: Gilmore, 384.

Turtles, Uinta formation: Gilmore,
386.

Mineralogy.

Tintic district: Means, 731.

Willemite, Star district, Beaver
County: Clark, 193.

Vanadium.

General: Fleck, 359; Joseph, 540.

Arizona: Joseph, 540.

United States: Hess, 454.

- Veins.**
Cross-fiber veins, origin: Taber, 1064.
- Vermes.**
Cambrian: Walcott, 1143.
- Vermont.**
Stratigraphic.
Algonkian-Cambrian boundary: Dale, 248.
- Vertebrata (general).** *See also* Amphibia; Aves; Mammalia; Pisces; Reptilia.
Air-breathing Vertebrata, origin: Barrell, 40.
Florida: Hay, 435.
Tertiary and Pleistocene: Sellards, 967.
Nevada, Cedar Mountain region: Merriam, 787.
New Mexico, San Juan County: Gilmore, 387.
Permian: Cope and Matthew, 229.
Porto Rico: Reeds, 891.
Progress, recent: Eastman *et al.*, 331.
Rancho La Brea deposits: Matthew, 726.
Rise of air-breathing vertebrates: Barrell, 40.
- Virginia.**
General.
Report State geologist, 1914-15: Watson, 1162.
Economic.
Barite: Watson and Sharshall, 1165.
Bucu quadrangle, Virginia: Hinds, 467.
Clintwood quadrangle, Virginia: Hinds, 467.
Coal, Clintwood and Bucu quadrangles: Hinds, 467.
Feldspar: Watts, 1168.
Lead and zinc, southwestern Virginia: Ball and Thompson, 31.
Manganese: Hewett, 458, 459.
Oriskany iron ore: Holden, 478.
Zircon-bearing pegmatites: Watson, 1163.
Stratigraphic.
Bucu quadrangle, Virginia: Hinds, 467.
Clintwood quadrangle, Virginia: Hinds, 467.
Paleontology.
Arcas: Sheldon, 983.
Miocene: Olsson, 807.
Petrology.
Blue Ridge region: Watson and Cline, 1164.
Zircon-bearing pegmatites: Watson, 1163.
Mineralogy.
Amelia County, pegmatites: Watson, 1163.
- Virgin Islands.**
Physiographic.
Littoral and sublittoral features: Vaughan, 1132.
- Volcanic rocks.** *See* Igneous and volcanic rocks.
- Volcanism.**
General: Day, 277.
Australites: Moore, 777.
Cause: Meunier, 754.
Explosion craters: Darton, 260.
Gaseous emanations: Day, 276.
Pele's tears: Moore, 777.
- Volcanoes.**
Alaska, Bogoslof: Powers, 857.
California, Lassen Peak: Diller, 298, 300.
eruption: Palmer, 829.
volcanic history: Diller, 299.
Colima, catalog of eruptions: Arreola, 18.
Hawaii: Jaggard and Wood, 511.
Halemaumau: Powers, 857.
Kilauea, explosive ejectamenta: Powers, 856.
Mauna Loa, Mokuaweoweo: Wood, 1254.
- Volcanoes (extinct).**
Arizona, Carrizo Mountain: Emery, 342.
- Washington.**
General.
Survey, report 1913-1915: Wash. G. S., 1157.
Economic.
Conconully and Ruby districts: Jones, 535.
Electric-Point mine: Lakes, 608.
Mineral production, 1915: Gerry, 381.
Mineral resources: Weaver, 1176.
Oil and gas possibilities: Weaver, 1170.
Physiographic.
General: Saunders, 939; Weaver, 1170.
Conconully and Ruby districts: Jones, 535.
Contraposed shore lines, Juan de Fuca strait: Keyes, 567.
Stratigraphic.
General: Weaver, 1170.
Conconully and Ruby districts: Jones, 535.
Cowlitz River valley, Eocene: Weaver, 1171.
Oligocene, Kitsap County: Weaver, 1173.
Olympic Peninsula: Reagan, 888; Weaver, 1169.
Post-Eocene formations, western Washington: Weaver, 1172.
Skykomish basin: Smith, 1022.
Tertiary, western Washington: Weaver, 1174, 1176.
Paleontology.
Branchloplax, Port Townsend: Rathbun, 882.
Cowlitz River valley, Eocene: Weaver, 1171.

Washington—Continued.**Paleontology—Continued.**

Post-Eocene formations, western Washington: Weaver, 1172.

Skykomish basin: Smith, 1022.

Tertiary, western Washington: Weaver, 1174.

Underground water.

General: Landes, 612.

Water, underground. *See* Underground water.

Weathering.

General: Ehrenfeld, 335.

Arkose deposits: Barton, 43.

Corrosive action of brines, Manitoba: Wallace, 1150.

Hornblende gabbro, zonal weathering: Brokaw and Smith, 113.

Well records. *See* Borings.

West Indies (general). *See also* names of islands.

General: Vaughan, 1130.

West Virginia.**General.**

Soils, Raleigh County: Latimer, 619.

Economic.

Appalachian geosyncline, deep sand oil and gas possibilities: Reger, 893.

Coal, Lewis and Gilmer counties: Reger, 892.

Meadow Branch field: Grimsley, 416.

Mercer County: Krebs and Teets, 602.

Raleigh County: Krebs and Teets, 602.

Summers County: Krebs and Teets, 602.

Coal beds: Hennen, 450.

Jefferson, Berkeley, and Morgan counties: Grimsley, 416.

Lewis and Gilmer counties: Reger, 892.

Mercer County, western part: Krebs and Teets, 602.

Natural gas, Lewis and Gilmer counties: Reger, 892.

Petroleum, Lewis and Gilmer counties: Reger, 892.

Raleigh County: Krebs and Teets, 602.

Summers County, western part: Krebs and Teets, 602.

Physiographic.

Jefferson, Berkeley, and Morgan counties: Grimsley, 416.

Lewis and Gilmer counties: Reger, 892.

Raleigh County: Krebs and Teets, 602.

Stratigraphic.

Jefferson, Berkeley, and Morgan counties: Grimsley, 416.

Lewis and Gilmer counties: Reger, 892.

West Virginia—Continued.**Stratigraphic—Continued.**

Mercer County, western part: Krebs and Teets, 602.

Raleigh County: Krebs and Teets, 602.

Summers County, western part: Krebs and Teets, 602.

Paleontology.

Lewis and Gilmer counties: Price, 865.

Raleigh and adjacent counties: Price, 866.

Wind work.

Loess, origin and age: Savage, 942.

Wisconsin.**General.**

Soils, Bayfield area: Whitson *et al.*, 1215.

Fond du Lac County: Whitson *et al.*, 1216.

Iowa County: Whitson *et al.*, 1214.

Juneau County: Whitson *et al.*, 1217.

Kewaunee County: Whitson *et al.*, 1218.

La Crosse County: Whitson *et al.*, 1219.

northwestern Wisconsin: Musbach *et al.*, 785.

Waukesha County: Whitson *et al.*, 1213.

Waushara County: Whitson *et al.*, 1212.

Economic.

Iron ore, eastern Wisconsin, age: Savage and Ross, 945.

northwestern Wisconsin: Hotchkiss *et al.*, 489.

Dynamic and structural.

Fulgurites, Sparta: Shipton, 993.

Physiographic.

General: Martin, 708.

Penepains, Driftless Area: Hughes, 497.

Stratigraphic.

General: Weldman and Schultz, 1181.

Alexandrian rocks, eastern Wisconsin: Savage, 944.

Dunn County, Pleistocene: Hussakof, 509.

Northwestern Wisconsin: Hotchkiss *et al.*, 489.

Sparta shale: Shipton, 994.

Paleontology.

Alexandrian rocks, eastern Wisconsin: Savage, 944.

Cristivomer namaycush, Pleistocene: Hussakof, 509.

Trilobites, Silurian: Raymond, 884.

Underground water.

General: Weldman and Schultz, 1181.

Wyoming.**Economic.**

Anticlines, central Wyoming: Hares, 424.

Gold, Atlantic district, Fremont County: Spencer, 1029.

Wyoming—Continued.

Economic—Continued.

Gold, silver, copper, lead, in 1915: Henderson, 447.

Gypsum, Bighorn Mountains: Lupton and Condit, 662.

Natural gas, Basin field: Lupton, 659.
Grass Creek oil and gas field: Hintze, 469.

Little Buffalo Basin field: Hintze, 468.

North Laramie Mountains, Converse and Albany counties: Spencer, 1028.

Oil shale, Green River basin: Winchester, 1247.

Petroleum, Basin field: Lupton, 659.

Cretaceous: Trumbull, 1096.

Grass Creek field: Hintze, 469.

in granite, Fremont Co: Trumbull, 1094.

Little Buffalo Basin field: Hintze, 468.

Pilot Butte field, Fremont County: Ziegler, 1275.

Phosphate, Salt River Range: Mansfield, 694.

Salt River Range: Mansfield, 694.

Dynamic and structural.

Anticlines, central Wyoming: Hares, 424.

Stratigraphic.

Anticlines, central Wyoming: Hares, 424.

Atlantic district, Fremont County: Spencer, 1029.

Bighorn Basin: Lupton, 659, 661.

Bighorn Mountains, southern part: Lupton and Condit, 662.

Big Muddy and Douglas oil and gas fields, map: Wyo. St. G., 1266.

Central Wyoming: Hares, 424.

Cretaceous formations: Hares, 423.

Embar and Chugwater formations, central Wyoming: Condit, 224.

Embar formation: Branson, 104.

Grass Creek oil and gas field: Hintze, 469.

Hanna basin: Bowen, 93.

Little Buffalo Basin oil and gas field: Hintze, 468.

Morrison formation: Knowlton, 593; Mook, 776.

North Laramie Mountains, Converse and Albany counties: Spencer, 1028.

Pilot Butte oil field, Fremont County:

Wyoming—Continued.

Paleontology—Continued.

Embar formation: Branson, 104.

Plants, Morrison formation: Knowlton, 593.

Turtles, Lance formation: Gilmore, 385.

Wyomingite, extraction of potash from: Wells, 1188.

Yellow Pine district, Nevada: Palmer, 833.

Yellowstone National Park.

Geysers: Anon., 1278.

Yukon.

Economic.

General: Annes, 12; Cairnes, 158.

Coal: Cairnes, 157.

Gold: Cairnes, 158.

Mayo area: Cairnes, 159.

Mayo area: Cairnes, 159.

Scroggie, Barker, Thistle, and Kirkman creeks: Cairnes, 159.

Wheaton district, southern Yukon: Cairnes, 159.

Stratigraphic.

General: Annes, 12.

Wheaton district, southern Yukon: Cairnes, 159.

Zinc.

General: Joseph, 541.

Oxidized ores, formation from sulphide: Wang, 1153.

Arizona: Helkes, 443; Joseph, 541.

California and Oregon: Yale, 1268.

Central States: Dunlop and Butler, 328.

Colorado: Henderson, 449.

Eastern States: Hill, 462.

Idaho: Gerry, 381.

Illinois, Galena-Elizabeth quadrangles: Shaw and Trowbridge, 982; Trowbridge and Shaw, 1090.

Joplin ore deposits: Bain, 26.

Montana: Helkes, 444.

Nevada: Helkes, 445.

Yellow Pine district: Palmer, 833.

New Mexico: Henderson, 448.

New York, Edwards district: Newland, 792.

St. Lawrence County: Hatmaker, 432.

Ontario: Uglow, 1110.

Quebec: Uglow, 1110.

Portneuf County: Bancroft, 32.

Texas: Henderson, 448.

United States: Siebenthal, 997, 999.

LISTS.

(The numbers refer to entries in the bibliography.)

CHEMICAL ANALYSES.¹

- | | |
|-----------------------------------|--|
| Adobe soil, 942. | Hodgkinsonite, 948. |
| Akerite, 1164. | Hornblende gabbro, 113. |
| Åkermanite, 948. | Hornblende porphyry, 342. |
| Albertite, 973. | Hübnerite, 359. |
| Albite, 287, 1163. | Hydromagnesite, 1271. |
| Allanite, 1163. | Hydrozincite, 370. |
| Alunite, 948, 1188, 1197. | Hypersthene syenite, 1164. |
| Alurgite, 948. | Inyoite, 948. |
| Amazonite, 287. | Iron ore, 373, 563, 629, 644. |
| Apatite, 1163. | Kaolin, 1158. |
| Arseno-bismite, 731. | Koechlinite, 948. |
| Augite syenite, 1164. | Laterite, 563. |
| Autunite, 359. | Lignite, 678, 922. |
| Barite, 1165. | Limestone, 88, 585, 650, 789, 873, 879, 892. |
| Basalt 485, 860. | Loess, 942. |
| Beryl, 1163. | Loretoite, 1189. |
| Bismutite, 731. | Lucinite, 948. |
| Bones fossil, 968. | Manganese ore, 878. |
| Bornite, 7. | Marble, 194, 789, 873. |
| Brine, 460. | Margarosanite, 371. |
| Cancrinite, sulphatic, 617. | Mariposite, 948. |
| Carnotite, 359. | Marl, 650. |
| Cebollite, 948. | Meerschau, 824. |
| Chalk, 650. | Melanochalcite, 501. |
| Clay, 268, 892, 1119. | Mellilite, 948. |
| Coal, 163, 678, 855, 892. | Metagabbro, 88. |
| Columbite, 1163. | Meteorites, 749. |
| Creedite, 618. | Meyerhofferite, 948. |
| Custerite, 948. | Mica, 287. |
| Desclouzeite, 359. | Microcline, 287. |
| Diabase, 88, 585, 1057. | Microcline, 1163. |
| Diorite, 563. | Miloschite, 1199. |
| Dolomite, 873, 879, 982. | Molybdenite, 359. |
| Feldspar, 29, 287, 1057. | Monazite, 1163. |
| Feldspar porphyry, 485. | Natural gas, 659. |
| Felsite, 140. | Nephelite, 948. |
| Ferberite, 359. | Norite: Newland, 789. |
| Fuggerite, 948. | Oil shale, 1247. |
| Gabbro, 373, 789, 1164. | Patronite, 359. |
| Garnet, 562, 564. | Petroleum, 504, 659. |
| Gearsautite, 618. | Pectolite, 892. |
| Gehlenite, 948. | Peridotite, 563. |
| Glass rock, 982. | Phosphate, 288, 514. |
| Gneiss, 29, 88. | Pinite, 129. |
| Granite, 29, 313, 357, 789, 1164. | Porphyry, 90, 258, 485. |
| Granite porphyry, 140. | Psilomelanite, 1197. |
| Granophyre, 140. | Pyrophyllite, 129. |
| Greenstone, 585. | Pyroxene, 1057. |
| Greensand, 650. | Pyroxenite, 1164. |
| Helvite, 1163. | Quartz monzonite, 1164. |
| Hibbenite, 852. | Quartz-feldspar porphyry, 140. |

¹The analyses in entry no. 756 of the bibliography have not been included in this list.

CHEMICAL ANALYSES—Continued.

Quartzite, 88.
 Rhyolite, 129.
 Romeite, 948.
 Roscoelite, 359.
 Sandstone, 892.
 Sarcollite, 948.
 Scheelite, 359.
 Schneebergite, 948.
 Schist, 88.
 Selensulphur, 123.
 Serpentine, 563.
 Serpentine rock, 629.
 Shale, 892, 1119.
 Stellarite, 973.
 Spencerite, 852.
 Spessartite, 1163.

Syenite, 789, 1184.
 Tasmanite, 973.
 Thaumassite, 124.
 Titanite, 1197.
 Torbanite, 973.
 Tremolite, 948.
 Uraninite, 11, 359.
 Vanadinite, 359.
 Vashegyite, 1194.
 Velardeite, 948.
 Valuwite, 329.
 Water, 289, 357, 674, 937, 1181.
 Wolframite, 359.
 Wood tin, 591.
 Wyomingite, 1188.
 Yellowstonose, 342.

MINERALS DESCRIBED.

Adamite, 731.
 Akermanite, 948.
 Albertite, 973.
 Alunite, 948, 1197.
 Alurgite, 948.
 Aragonite, 529.
 Argentine, 398.
 Arseno-bismite, 731.
 Autunite, 359.
 Azurite, 543.
 Barite, 992.
 Bismite, 731.
 Bismutite, 731.
 Bloedite, 948.
 Bornite, 7.
 Calcite, 529.
 Calcite, lamellar, 398, 433.
 Calcium carbonate hexahydrate, 529.
 Cancrinite, sulphatic, 617.
 Carnotite, 359.
 Cebollite, 948.
 Celestite, 244.
 Chalcocite, 543.
 Chalcopyrite, 217, 543.
 Chrysocolla, 543.
 Conchite, 529.
 Creedite, 618.
 Cuprite, 543.
 Custerite, 948.
 Daubréeite, 731.
 Desclozite, 359.
 Enargite, 543.
 Ferberite, 359.
 Fremontite, 948.
 Fuggerite, 948.
 Gearksutite, 618.
 Gehlenite, 948.
 Geocronite, 731.
 Glauberite, 1195.
 Hibbenite, 852.
 Hodgkinsonite, 948.
 Hopeite, 1148.
 Hübnerite, 359.
 Hydrozincite, 370.
 Inyoite, 948.
 Jarosite, 731.
 Kaolinite, intumescent, 952.
 Koechlinite, 948.
 Ktypeite, 529.
 Loretoite, 1189.

Lublinite, 529.
 Lucinite, 948.
 Malachite, 543.
 Manganoalcite, 638.
 Margarosanite, 371.
 Mariposite, 948.
 Melanochalcite, 501.
 Mellite, 948.
 Meyerhofferite, 948.
 Miloschite, 1199.
 Minerals, useful: Willis, 1234.
 Molybdenite, 359.
 Monticellite, 329.
 Natrolite, 853.
 Nephelite, 948.
 Patronite, 359.
 Pectolite, 392.
 Pentlandite, 217.
 Pisanite, 948.
 Psilomelanite, 1197.
 Pyrrhotite, 217.
 Romeite, 948.
 Roscoelite, 359.
 Sarcollite, 948.
 Scheelite, 359.
 Schneebergite, 948.
 Selensulphur, 123.
 Spencerite, 852.
 Spodumene, 948.
 Stevensite, 392.
 Strengite, 948.
 Strontianite, 244.
 Tasmanite, 973.
 Tetrahedrite, 543.
 Thaumassite, 124, 948.
 Titanite, 1197.
 Torbanite, 973.
 Torbernite, 359.
 Tremolite, 948.
 Uraninite, 359.
 Vanadinite, 359.
 Variscite, 948.
 Vashegyite, 1194.
 Vaterite, 529.
 Velardeite, 948.
 Valuwite, 329.
 Willemite, 193.
 Wolframite, 359.
 Xanthophyllite, 329.

ROCKS DESCRIBED.

Akerite, 1164.
 Andesite, 258.
 Andesite-porphyrity, 679.
 Anorthosite, 789.
 Anorthosite gabbro, 766.
 Aplite, 1057.
 Augite andesite, 679.
 Basalt, 147, 258, 485, 679.
 Dacite, 342.
 Dacite porphyry, 147.
 Diabase, 88, 440, 485, 679, 766, 789, 1057.
 Diorite, 147, 440, 789.
 Diorite-andesite, 824.
 Diorite porphyry, 342.
 Feldspar porphyry, 485.
 Gabbro, 373, 766, 789, 1164.
 Gneiss, 88, 789.
 Granite, 440, 766, 789, 1023, 1164.
 Granite porphyry, 258.
 Granodiorite, 824.
 Greenstone, 147.
 Hypersthene syenite, 1164.
 Iron ore, 873.
 Keratophyre, 258.
 Metagabbro, 88.

Micropegmatite, 1057.
 Norite, 1164.
 Pegmatite, 88, 789.
 Peie's tears: Moore, 777.
 Peridotite, 147.
 Pinite, 129.
 Porphyry, 258, 766.
 Pyrophyllite, 129.
 Pyroxene, 1057.
 Pyroxenite, 1164.
 Quartz basalt, 258.
 Quartz diorite, 258, 679.
 Quartz diorite porphyry, 824.
 Quartz latite, 258.
 Quartz monzonite, 824, 1023, 1164.
 Quartz porphyry, 1023.
 Rhyolite, 147, 258.
 Rhyolite porphyry, 258.
 Schist: Newland, 789.
 Serpentine, 88, 789.
 Syenite: Miller, 766, 789, 1164.
 Syenite porphyry, 147.
 Unakite, 1164.
 Volcanic breccia, 1023.

GEOLOGIC FORMATIONS DESCRIBED.

Abrigo limestone, Cambrian, Arizona: Bonillas *et al.*, 90; Ransome, 881.
 Afton terrane, Pleistocene, Kansas: Keyes, 565.
 Aftonian interglacial deposits, Pleistocene, Iowa: Leighton, 626.
 Agnotozoic era, pre-Cambrian: Schuchert, 962.
 Agoniatites limestone, Devonian, New York: Smith, 1008.
 Alamito shales, Carboniferous, New Mexico: Keyes, 565.
 Albany formation, Permian, Texas: Udden *et al.*, 1107.
 Albuquerquean series, pre-Cambrian, New Mexico: Keyes, 565.
 Alexandrian series, Silurian, Missouri: Keyes, 565.
 Algoman, pre-Cambrian, Ontario: Baker, 29.
 Algoman granite, pre-Cambrian, Ontario: Knight, 585.
 Algoman granite, pre-Cambrian, Great Lakes region: Lawson, 620.
 Algonic period, pre-Cambrian, Missouri: Keyes, 565.
 Algonian revolution, pre-Cambrian: Schuchert, 962.
 Algonkian, pre-Cambrian: Schuchert, 962.
 Allegheny formation, Carboniferous, Ohio: Condit, 228.
 Allegheny series, Carboniferous, West Virginia: Krebs and Teets, 602; Reger, 892.
 Allegrippus conglomerate, Devonian, West Virginia: Grimsley, 416.
 Alta beds, Pennsylvanian, Texas: Udden *et al.*, 1107.
 Alum Bluff formation, Oligocene, Georgia: Brantly, 105.
 Alum Bluff formation, Tertiary, Alabama, Florida: Matson, 714.

Alum Bluff formation, Tertiary, Florida: Berry, 65.
 Ames limestone and shale, Pennsylvanian, West Virginia: Reger, 892.
 Ames ("Crinoidal") limestone, Carboniferous, Ohio: Condit, 223.
 Amherstburg dolomite, Devonian, Michigan and Ontario: Stauffer, 1038.
 Anacacho limestone, Cretaceous, Texas: Udden *et al.*, 1107.
 Anderson limestone, Devonian, Michigan and Ontario: Stauffer, 1038.
 Animikian, pre-Cambrian, Ontario: Knight, 585.
 Animikian series, pre-Cambrian, Missouri: Keyes, 565.
 Ankareh formation, Triassic, Wyoming: Mansfield, 694.
 Ankareh sandstone, Triassic, Idaho: Mansfield, 693.
 Annabelle shale, Pennsylvanian, West Virginia: Reger, 892.
 Annapolis formation, Triassic, Nova Scotia and New Brunswick: Powers, 857a.
 Annona chalk, Cretaceous, Louisiana: Matson, 711.
 Anona chalk, Cretaceous, Texas: Udden *et al.*, 1107.
 Antietam sandstone, Cambrian, West Virginia: Grimsley, 416.
 Antlers sand, Cretaceous, Texas: Udden *et al.*, 1107.
 Antonio terrane, pre-Cambrian, New Mexico: Keyes, 565.
 Antonito terrane, Carboniferous, New Mexico: Keyes, 565.
 Apache group, Cambrian (?), Arizona: Ransome, 881.
 Apalachicola group, Oligocene, Georgia: Brantly, 105.

- Aplshapa terrane, Cretaceous, New Mexico: Keyes, 565.
 Archeozoic era, pre-Cambrian: Schuchert, 962.
 Archuleta terrane, Tertiary, New Mexico: Keyes, 565.
 Arcilio limestone, Tertiary, Porto Rico: Reeds, 891.
 Arikaree (?) sandstone, Tertiary (Miocene), South Dakota: Winchester *et al.*, 1248.
 Arikaree terrane, Tertiary, Kansas: Keyes, 565.
 Arkadelphia clay, Cretaceous, Louisiana: Matson, 711.
 Arkadelphia clay, Cretaceous, Texas: Udden *et al.*, 1107.
 Arkanian series, Carboniferous, Kansas: Keyes, 565.
 Arkanian series, Carboniferous, Missouri: Keyes, 565.
 Armendaris terrane, Ordovician, New Mexico: Keyes, 565.
 Arnheim, Ohio: Braun, 107.
 Arnheim shale, Ordovician, Ohio: Fenneman, 352.
 Arnoldsburg sandstone, Pennsylvanian, West Virginia: Reger, 892.
 Arriban series, Tertiary, New Mexico: Keyes, 565.
 Arundel formation, Cretaceous, Maryland: Clark, 195.
 Ashcroft rhyolite porphyry, Oligocene(?), British Columbia: Drysdale, 316.
 Athabaska sandstone, pre-Cambrian, Northwest Territory, Canada: Cammell, 165.
 Austin chalk, Cretaceous, Texas: Matson, 712; Udden *et al.*, 1107.
 Austin group, Cretaceous, Louisiana: Matson, 711.
 Aux Vases sandstone, Mississippian, Illinois and Kentucky: Weller, 1185.
 Azole, pre-Cambrian: Schuchert, 962.
 Aztec series, Tertiary, New Mexico: Keyes, 565.
 Bailey terrane, Devonian, Missouri: Keyes, 565.
 Baltimore gneiss, pre-Cambrian, Pennsylvania: Bliss and Jonas, 88.
 Banff (Upper) shale, Alberta: Burling, 133.
 Barnes conglomerate, Cambrian(?), Arizona: Ransome, 881.
 Barnwell formation, Eocene, Georgia: Brantley, 105.
 Barron quartzite, pre-Cambrian, Wisconsin: Hotchkiss *et al.*, 489.
 Barton Creek limestone, Cretaceous, Texas: Udden *et al.*, 1107.
 Bashl formation, Tertiary, Gulf States: Berry, 63.
 Basin shale, Cretaceous, Wyoming: Hintze, 468.
 Bas Obispo formation, Canal Zone: MacDonald, 671.
 Batesville sandstone, Mississippian, Arkansas: Purdue and Miser, 879.
 Bearpaw formation, Cretaceous, Alberta: Sinclair, 1000; Slipper, 1006; Stewart, 1051.
 Bearpaw shale, Cretaceous, Montana: Stebinger, 1041, 1042.
 Beartooth quartzite, Cretaceous, New Mexico: Paige, 824.
 Beaumont clays, Pleistocene, Texas: Udden *et al.*, 1107.
 Bechler conglomerate, Cretaceous(?), Idaho: Mansfield and Rounchy, 698.
 Becraft member, Devonian, West Virginia: Grimsley, 416.
 Beekmantown limestone, Ordovician, West Virginia: Grimsley, 416.
 Belfast bed, Silurian, Ohio: Prosser, 870.
 Bella terrane, Devonian, New Mexico: Keyes, 565.
 Bellevue limestone member, Ordovician, Ohio: Fenneman, 352.
 Bellevue member, Ordovician, Ohio: Braun, 107.
 Belly River formation, Cretaceous, Alberta: Sinclair, 1000; Slipper, 1006; Stewart, 1051.
 Belt formation, pre-Cambrian, Montana: Haynes, 440.
 Belt series, Algonkian, Montana: Walcott, 1146.
 Belt terrane, Algonkian, Montana: O'Connell, 802.
 Bend series, Pennsylvanian, Texas: Udden *et al.*, 1107.
 Benson formation, Cretaceous, British Columbia: Clapp, 188.
 Benton formation, Cretaceous, Alberta: Sinclair, 1000; Slipper, 1006; Stewart, 1051.
 Benton shale, Cretaceous, Wyoming: Darton, 259.
 Benton formation, Cretaceous, Wyoming: Hintze, 468.
 Benwood limestone member, Carboniferous, Ohio: Condit, 223.
 Berea formation, Carboniferous, Ohio and Pennsylvania: Verwiebe, 1137.
 Berea sand, Mississippian, Ohio: Condit, 223.
 Berenda terrane, Devonian, New Mexico: Keyes, 565.
 Bernalillian series, Carboniferous, New Mexico: Keyes, 565.
 Bertie waterlime, Silurian, New York: O'Connell, 802.
 Bexar formation, Cretaceous, Texas: Udden *et al.*, 1107.
 "Big Clifty" sandstone, Mississippian, Kentucky: Butts, 150.
 Big Sheep volcanics, British Columbia: Drysdale, 316.
 Binnewater sandstone, Devonian, New York: Schuchert, 961.
 Birmingham shale, Pennsylvanian, West Virginia: Reger, 892.
 Biwabik iron formation, Algonkian, Minnesota: Wolff, 1253.
 Black River group, Ordovician, Ontario: Baker, 29; Kindle, 577.
 Black River limestone, Ordovician, New York: Miller, 766.

- Blairmore formation, Cretaceous, Alberta: McLearn, 683; Sinclair, 1000.
- Blairmore formation (Dakota?), Tertiary, Alberta: Stewart, 1051.
- Blakeley horizon, Oligocene, Washington: Weaver, 1176.
- Blanco beds, Pliocene, Texas: Udden *et al.*, 1107.
- Blanco terrane, Tertiary, Kansas: Keyes, 565.
- Bliss quartzites, Cambrian, New Mexico: Keyes, 565.
- Bliss sandstone, Cambrian, New Mexico: Darton, 258; Paige, 824.
- Bliss sandstone, Cambrian, Texas: Udden *et al.*, 1107.
- Blomidan shale, Triassic, Nova Scotia and New Brunswick: Powers, 857a.
- Bloomsburg red sandstone, Silurian, West Virginia: Grimsley, 416.
- Blossom sand member, Cretaceous, Louisiana: Matson, 711.
- Blossom sand, Cretaceous, Texas: Udden *et al.*, 1107.
- Bloyd shale, Pennsylvanian, Arkansas: Purdue and Miser, 879.
- Bohio conglomerate, Oligocene(?), Canal Zone: MacDonald, 671.
- Bolsa quartzite, Cambrian, Arizona: Bonillas *et al.*, 90; Ransome, 881.
- Boone limestone, Mississippian, Arkansas: Purdue and Miser, 879.
- Boquillas flags, Cretaceous, Texas: Udden *et al.*, 1107.
- Bossardville limestone, Silurian, West Virginia: Grimsley, 416.
- Bowling Green limestone, Silurian, Missouri: Rowley, 926.
- Bozeman formation, Tertiary, Montana: Haynes, 440.
- Braddyville beds, Carboniferous, Iowa: Smith, 1009, 1010.
- Brassfield limestone, Silurian, Ohio, and Indiana: Prosser, 870.
- Braser limestone, Carboniferous, Wyoming: Mansfield, 694.
- Brentwood limestone member, Pennsylvanian, Arkansas: Purdue and Miser, 879.
- Brewster formation, Cambrian, Texas: Udden *et al.*, 1107.
- Bridge River series, Devonian-Carboniferous, British Columbia: Drysdale, 316.
- Bright Angel shale, Cambrian, Arizona: Ransome, 881.
- Brookville terrane, Cretaceous, Kansas: Keyes, 565.
- Brownstown marl, Cretaceous, Louisiana: Matson, 711.
- Brownstown marl, Cretaceous, Texas: Udden *et al.*, 1107.
- Brownstown sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Bruce series, Huronian, Ontario: Collins, 220.
- Bruce series, pre-Cambrian, Great Lakes region: Lawson, 620.
- Brush Creek limestone and shale, Pennsylvanian, West Virginia: Reger, 892.
- Bryant terrane, Ordovician, Missouri: Keyes, 565.
- Buchanan gravel, Pleistocene, Iowa: Leighton, 626.
- Buckingham series, pre-Cambrian, Quebec: Wilson, 1248.
- Buda limestone, Cretaceous, Texas: Udden *et al.*, 1107.
- Buffalo sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Buffalo terrane, Ordovician, Missouri: Keyes, 565.
- Bulkley formation, Cretaceous, British Columbia: MacKenzie, 680.
- Burro terrane, Cambrian, New Mexico: Keyes, 565.
- Caballos novaculite, Devonian (?), Texas: Udden *et al.*, 1107.
- Cache Creek group, Devonian-Carboniferous, British Columbia: Drysdale, 316.
- Cadwallador diorite, Jura-Triassic (?), British Columbia: Drysdale, 316.
- Cadwallador series, Jura-Triassic (?), British Columbia: Drysdale, 316.
- Calmito formation, Oligocene, Canal Zone: MacDonald, 671.
- Calvert formation, Tertiary, Maryland: Berry, 66.
- Campa Grande formation, Cretaceous, Texas: Udden *et al.*, 1107.
- Cambridge limestone, Carboniferous, Ohio: Condit, 223.
- Campbell Creek limestone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Canadian series, Ordovician, Missouri: Keyes, 565.
- Canajoharie (Trenton) shale, Ordovician, New York: Miller, 766.
- Cannonball marine member, Tertiary, South Dakota: Winchester *et al.*, 1248.
- Canyon formation, Pennsylvanian, Texas: Udden *et al.*, 1107.
- Canyon Largo terrane, Tertiary, New Mexico: Keyes, 565.
- Cape Blanco beds, Miocene, Oregon: Martin, 704.
- Capitan limestone, Permian, Texas: Udden *et al.*, 1107.
- Capitan terrane, Carboniferous, New Mexico: Keyes, 565.
- "Capitol Creek shale," Cambrian, Montana: Walcott, 1146.
- Cap Mountain formation, Cambrian, Texas: Udden *et al.*, 1107.
- Capping quartzite, Cambrian, Arizona: Bonillas *et al.*, 90.
- Carbondale formation, Pennsylvanian, Illinois: Cady, 156; Rich, 900; Savage, 940; Young, 1272.
- Cardiff shale, Devonian, New York: Smith, 1008.
- Caribbean limestone, Pleistocene or Pliocene, Canal Zone, MacDonald, 671.
- Carlile shale, Cretaceous, Colorado: Finlay, 857.
- Carlinville limestone, Pennsylvanian, Illinois: Cady, 156; Young, 1272.

- Carrasco terrane, Cambrian, New Mexico: Keyes, 565.
- Carrizo formation, Eocene, Texas: Udden *et al.*, 1107.
- Carrizo formation, pre-Cambrian, Texas: Udden *et al.*, 1107.
- Cason shale, Ordovician, Arkansas: Purdue and Miser, 879.
- Casper formation, Carboniferous, Wyoming: Darton, 259.
- Castile gypsum, Permian, Texas: Udden *et al.*, 1107.
- Cataboula sandstone, Tertiary, Gulf States: Matson, 714.
- Cataboula sandstone, Tertiary, Mississippi: Hopkins, 483.
- Catoctin schist, pre-Cambrian, West Virginia: Grimsley, 416.
- Catskill formation, Devonian, West Virginia: Grimsley, 416.
- Cawker terrane, Cretaceous, Kansas: Keyes, 565.
- Cayugan series, Silurian, New York: Schuchert, 961.
- Cedar Grove (Lower) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Cedar Grove (Middle) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Cedar Grove (Upper) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Cedarville dolomite, Silurian, Ohio: Prosser, 869, 870.
- Cedarville sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Cenocene series, Quaternary, New Mexico: Keyes, 565.
- Chaco terrane, Tertiary, New Mexico: Keyes, 565.
- Chacra terrane, Cretaceous, New Mexico: Keyes, 565.
- Chaman series, Tertiary, New Mexico: Keyes, 565.
- Chambersburg limestone, Ordovician, West Virginia: Grimsley, 416.
- Chambly member, Ordovician, Quebec: Foerste, 365.
- Champlain or Leda clays, Pleistocene, Canada: Johnston, 533.
- Chanac formation, Tertiary, California: Buwalda, 153.
- Chapman sandstone, Devonian, Maine: Williams, 1226.
- Chaves terrane, Carboniferous, New Mexico: Keyes, 565.
- Chester group, Mississippian, Illinois: Rich, 900.
- Chetang formation, Cambrian, Alberta: Burling, 133.
- Chemung formation, Devonian, West Virginia: Grimsley, 416.
- Chemungan series, Devonian, Missouri: Keyes, 565.
- Cheyenne terrane, Cretaceous, Kansas: Keyes, 565.
- Chickies formation, Cambrian, Pennsylvania: Bliss and Jonas, 88.
- Chico group, Cretaceous, California: Packard, 820.
- Chico formation, Cretaceous, Washington: Weaver, 1176.
- Chilton (Lower) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Chilton (Upper) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Chilton (Upper) (?) or Cleveland sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Chinle formation, Triassic, Arizona and Utah: Gregory, 405.
- Chipola marl member, Tertiary, Florida: Berry, 65.
- Chiricahuan series, Cambrian, New Mexico: Keyes, 565.
- Chisholm shales, Cambrian, Nevada: Walcott, 1147.
- Chisos beds, Cretaceous, Texas: Udden *et al.*, 1107.
- Chittistone limestone, Triassic, Alaska: Martin, 705; Moffit, 769.
- Chloridian series, Cambrian, New Mexico: Keyes, 565.
- Choctawhatchee marl, Tertiary, Florida: Berry, 65; Mansfield, 701.
- Chouteau limestone, Carboniferous, Missouri: Keyes, 568.
- Chugwater formation, Triassic, Wyoming: Condit, 224; Hares, 424; Lupton and Condit, 662; Ziegler, 1275.
- Chugwater formation, Triassic(?), Wyoming: Darton, 259.
- Chuska sandstone, Tertiary, Arizona and New Mexico: Gregory, 405.
- Cibola beds, Permian, Texas: Udden *et al.*, 1107.
- Cibola terrane, Silurian, New Mexico: Keyes, 565.
- Cleneguita beds, Pennsylvanian, Texas: Udden *et al.*, 1107.

- City Bluffs shale, Carboniferous, Iowa : Smith, 1009, 1010.
- Claiborne formation, Cretaceous, Mississippi : Logan, 650.
- Claiborne formation, Tertiary, Arkansas : Stephenson and Crider, 1047.
- Claiborne granite, Eocene, Texas : Udden *et al.*, 1107.
- Claiborne group, Eocene, Georgia : Brantly, 105.
- Claiborne group, Tertiary, Mississippi : Hopkins, 483.
- Clallam formation, Miocene, Washington : Weaver, 1176.
- Clarendon beds, Miocene, Texas : Udden *et al.*, 1107.
- Clarion sandstone, Pennsylvanian, West Virginia : Reger, 892.
- Clarksburg fire clay shale, Pennsylvanian, West Virginia : Reger, 892.
- Clarksburg red shale, Pennsylvanian, West Virginia : Reger, 892.
- Clarno formation, Eocene, Oregon : Collier, 218; Williams, 1229.
- Clayton limestone, Tertiary, Gulf States : Berry, 63.
- Clear Fork formation, Permian, Texas : Udden *et al.*, 1107.
- Cleveland sandstone, Pennsylvanian, West Virginia : Reger, 892.
- Clifty limestone, Devonian, Arkansas : Purdue and Miser, 879.
- Clinton beds, Silurian, Wisconsin : Weldman and Schultz, 1181.
- Clinton formation, Silurian, Pennsylvania : Schuchert, 961.
- Clinton formation, Silurian, West Virginia : Grimsley, 416.
- Clinton limestone, Silurian, Indiana : Culbertson, 239.
- Cloverly formation, Cretaceous, Wyoming : Hintze, 468; Lupton, 659.
- Cloverly (?) sandstone, Cretaceous, Wyoming : Darton, 259.
- Clore formation, Mississippian, Illinois : Brokaw, 111.
- Coalburg (Lower) sandstone, Carboniferous, West Virginia : Krebs and Teets, 602; Reger, 892.
- Coalburg (Upper) sandstone, Carboniferous, West Virginia : Krebs and Teets, 602; Reger, 892.
- Cobalt series, Huronian, Ontario : Collins, 220.
- Cobalt series, Pre-Cambrian, Great Lakes region : Lawson, 620.
- Cockfield formation, Eocene, Texas : Udden
- Colebrooke schist, Oregon : Butler and Mitchell, 147.
- Colgate sandstone, Cretaceous or Tertiary, Montana : Rowe and Wilson, 925.
- Collazo shale, Tertiary, Porto Rico : Reeds, 891.
- Collingwood shales, Ordovician, Ontario : Foerste, 365.
- Coloradan series, Cretaceous, Kansas : Keyes, 565.
- Coloradan series, Cretaceous, New Mexico : Keyes, 565.
- Colorado granite, Cretaceous, Colorado : Finlay, 357.
- Colorado series, Cretaceous, Wyoming : Ziegler, 1275.
- Colorado shale, Cretaceous, Montana : Barnett, 38; Stebinger, 1041, 1042.
- Colorado shale, Cretaceous, New Mexico : Darton, 258; Paige, 824.
- Columbia deposits, Pleistocene, Texas : Udden *et al.*, 1107.
- Columbia River lava, Miocene, Oregon : Collier, 218.
- Comanchan series, Cretaceous, Kansas : Keyes, 565.
- Comanchan series, Cretaceous, Missouri : Keyes, 565.
- Comanchan series, Cretaceous, New Mexico : Keyes, 565.
- Comanche Peak formation, Cretaceous, Texas : Udden *et al.*, 1107.
- Conasauga formation, Cambrian, Alabama : Walcott, 1145.
- Conemaugh formation, Carboniferous, Ohio : Condit, 223.
- Conemaugh series, Pennsylvanian, West Virginia : Reger, 892.
- Connellsville sandstone, Pennsylvanian, West Virginia : Reger, 892.
- Connellsville (Lower) sandstone, Pennsylvanian, West Virginia : Reger, 892.
- Conococheague limestone, Cambrian, West Virginia : Grimsley, 416.
- Cook Mountain formation, Eocene, Texas : Udden *et al.*, 1107.
- Cook Mountain formation, Tertiary, Texas : Deussen and Dole, 289.
- Corniferous limestone, Devonian, Indiana : Culbertson, 239.
- Coronado quartzite, Cambrian (?), Arizona : Ransome, 881.
- Corrigan formation, Oligocene (?), Texas : Udden *et al.*, 1107.
- Corry sandstone, Pennsylvanian : Verwiebe, 1137.
- Corryville member, Ordovician, Ohio :

- Cox formation, Cretaceous, Texas: Udden *et al.*, 1107.
- Coyote terrane, Carboniferous, New Mexico: Keyes, 565.
- Cranberry formation, Cretaceous, British Columbia: Clapp, 188.
- Creston red shale, Pennsylvanian, West Virginia: Reger, 892.
- Cripple Creek granite, pre-Cambrian, Colorado: Finlay, 357.
- Cristobal terrane, Ordovician, New Mexico: Keyes, 565.
- Croixan series, Cambrian, Missouri: Keyes, 565.
- Crouse limestone, Carboniferous, Oklahoma: Heald, 441.
- Crowleyan series, Tertiary, Missouri: Keyes, 565.
- Cucaracha formation, Oligocene, Canal Zone: MacDonald, 671.
- Culebra formation, Oligocene, Canal Zone: MacDonald, 671.
- Cussewago sandstone, Pennsylvania: Verwiebe, 1187.
- Cuyama formation, Tertiary, California: English, 344.
- Cynthiana formation, Ordovician, Kentucky: Fenneman, 352.
- Cypress formation, Mississippian, Illinois: Brokaw, 111.
- Cypress sandstone, Mississippian, Illinois and Kentucky: Ulrich, 1112; Weller, 1185.
- Cyrene member, Silurian, Missouri: Rowley, 926.
- Dakota group, Cretaceous, Wyoming: Ziegler, 1275.
- Dakota sandstone, Cretaceous, Arizona and New Mexico: Gregory, 405.
- Dakota sandstone, Cretaceous, Colorado: Finlay, 357.
- Dakota sandstone, Cretaceous, Utah: Lupton, 660.
- Dakota sandstone, Cretaceous, Wyoming: Hares, 424.
- Dakotan series, Cretaceous, Kansas: Keyes, 565.
- Dakotan series, Cretaceous, New Mexico: Keyes, 565.
- Davis terrane, Cambrian, Missouri: Keyes, 565.
- Dawson arkose, Tertiary, Colorado: Finlay, 357.
- Dayton limestone, Silurian, Ohio: Prosser, 870.
- De Chelly sandstone, Permian(?), Arizona: Gregory, 405.
- Decorah shale, Ordovician, Iowa: Howell, 492.
- Decorah shale, Ordovician, Iowa and Illinois: Shaw and Trowbridge, 982.
- Decorah shale, Ordovician, Minnesota: Sardeson, 937.
- Decota sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- De Courcy formation, Cretaceous, British Columbia: Clapp, 188.
- Delaware limestone, Devonian, Ohio: Stauffer, 1040.
- Delaware Mountain formation, Permian, Texas: Udden *et al.*, 1107.
- Del Rio clay, Cretaceous, Texas: Udden *et al.*, 1107.
- Denton subgroup, Cretaceous, Texas: Udden *et al.*, 1107.
- Departure Bay calcarenites, Cretaceous, British Columbia: Clapp, 188.
- Derby terrane, Cambrian, Missouri: Keyes, 565.
- Des Moines series, Carboniferous, Missouri: Keyes, 565.
- Detroit River series, Devonian, Michigan, Ohio and Ontario: Stauffer, 1038.
- DeWitt formation, Miocene-Pliocene, Texas: Udden *et al.*, 1107.
- Dexter sands, Cretaceous, Texas: Udden *et al.*, 1107.
- Dimple formation, Pennsylvanian, Texas: Udden *et al.*, 1107.
- Dingess limestone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Dinwoody formation, Triassic, Wyoming: Condit, 224.
- Dinwoody formation, Triassic and Carboniferous(?), Wyoming: Lupton and Condit, 662.
- Dockum beds, Triassic, Texas: Udden *et al.*, 1107.
- Dockuman series, Triassic, Kansas: Keyes, 565.
- Dockuman series, Triassic New Mexico: Keyes, 565.
- Doloresian series, Triassic, New Mexico: Keyes, 565.
- Dorothy limestone and shale, Carboniferous, West Virginia: Krebs and Teets, 602.
- Dothan formation, Jurassic, Oregon: Butler and Mitchell, 147.
- Double Mountain formation, Permian, Texas: Udden *et al.*, 1107.
- Douglas shale, Carboniferous, West Virginia: Krebs and Teets, 602.
- Dragoonan series, Cambrian, New Mexico: Keyes, 565.
- Draney limestone, Cretaceous(?), Idaho: Mansfield and Roundy, 698.
- Dresbach sandstone, Cambrian, Minnesota: Sardeson, 937.
- Dresbach sandstone, Cambrian, Wisconsin: Shipton, 994.
- Dripping Spring quartzite, Cambrian(?), Arizona: Ransome, 881.
- Dry Creek shale, Cambrian, Montana: Walcott, 1146.
- Duck Creek formation, Cretaceous, Texas: Udden *et al.*, 1107.
- Duluth gabbro, Algonkian, Minnesota: Wolff, 1253.
- Dunkard series, Pennsylvanian, West Virginia: Reger, 892.
- Dunkard series, Permian, Ohio: Stauffer, 1039.
- Duplin marl, Miocene, Georgia: Brantly, 105.

- Eagle limestone and shale, Carboniferous, West Virginia: Krebs and Teets, 602.
- Eagle sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Eagle sandstone, Cretaceous, Montana: Calvert, 163; Stebinger, 1042.
- Eagle sandstone, Cretaceous, Wyoming: Hintze, 468.
- Eagle Ford clay, Cretaceous, Louisiana: Matson, 711.
- Eagle Ford clay, Cretaceous, Texas: Matson, 712.
- Eagle Ford formation, Cretaceous, Texas: Udden *et al.*, 1107.
- Eagle Ford shale, Cretaceous, Texas: Udden *et al.*, 1107.
- East Lynn sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Easton schist, pre-Ordovician, Washington: Smith, 1022.
- East Wellington formation, Cretaceous, British Columbia: Clapp, 188.
- Eckman sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Economy member, Ordovician, Ohio: Braun, 107.
- Eddy terrane, Carboniferous, New Mexico: Keyes, 565.
- Eden formation, Ordovician, Ohio: Braun, 107.
- Eden group, Ordovician, Ohio: Fenneman, 352.
- Edgewood limestone, Silurian, Illinois: Savage, 944.
- Edgewood limestone, Silurian, Missouri: Rowley, 926.
- Edmonton formation, Cretaceous, Alberta: Sinclair, 1000; Slipper, 1006.
- Edwards limestone, Cretaceous, Texas: Udden *et al.*, 1107.
- Egypt terrane, Cretaceous, Missouri: Keyes, 565.
- Elbrook formation, Cambrian, West Virginia: Grimsley, 416.
- Eldorado granodiorite, Cretaceous, British Columbia: Drysdale, 316.
- Eldorado series, Cretaceous, British Columbia: Drysdale, 316.
- Elk Lick limestone, Pennsylvanian, West Virginia: Reger, 892.
- Elko limestone, Cambrian, Alberta: Burling, 133.
- Elk River beds, Pliocene-Pleistocene, Oregon: Martin, 704.
- Ellenburger limestone, Cambrian, Ordovician, Texas: Udden *et al.*, 1107.
- Ellis formation, Jurassic, Montana: Barnett, 38.
- Ellis formation, Jurassic, Montana: Haynes, 440.
- El Pasan series, Ordovician, New Mexico: Keyes, 565.
- El Paso limestone, Ordovician, New Mexico: Darton, 258; Paige, 824.
- El Paso limestone, Ordovician, Texas: Udden *et al.*, 1107.
- Embar formation, Carboniferous, Wyoming: Branson, 104.
- Embar formation, Carboniferous-Triassic, Wyoming: Hares, 424.
- Embar formation, Carboniferous and Triassic, Wyoming: Condit, 224.
- Embar formation, Triassic and Carboniferous, Wyoming: Lupton and Condit, 662.
- Embarrass granite, Algonkian, Minnesota: Wolff, 1253.
- Emperador limestone, Oligocene, Canal Zone: MacDonald, 671.
- Empire formation, Miocene, Oregon: Martin, 704.
- Empire shale, Algonkian, Montana: Walcott, 1146.
- Empire shale, pre-Cambrian, Montana: Haynes, 440.
- Ep-Agnostozoic interval, pre-Cambrian: Schuchert, 962.
- Ep-Archeozoic interval, pre-Cambrian: Schuchert, 962.
- Ephraim conglomerate, Cretaceous(?), Idaho: Mansfield and Roundy, 698.
- Eplcene series, Quaternary, New Mexico: Keyes, 565.
- Epi-Proterozoic interval, pre-Cambrian: Schuchert, 962.
- Erian series, Devonian, Missouri: Keyes, 565.
- Erwin quartzite, Cambrian, Tennessee: Jenkins, 514.
- Escabrosa limestone, Mississippian, Arizona: Bonillas *et al.*, 90; Ransome, 881.
- Escondido formation, Cretaceous, Texas: Deussen and Dole, 289.
- Esmeralda formation, Tertiary, Nevada: Merriam, 737.
- Espanola limestone, pre-Cambrian, Ontario: Collins, 220.
- Etchegoin formation, Pliocene, California: Martin, 704.
- Etchegoin formation, Tertiary, California: Nomland, 795.
- Etheline formation, Tertiary, British Columbia: MacKenzie, 679.
- Eutaw formation, Cretaceous, Tennessee: Berry, 74.
- Eutaw sand, Cretaceous, Tennessee: Purdue, 877.
- Everton limestone, Ordovician, Arkansas: Purdue and Miser, 879.
- Extension formation, Cretaceous, British Columbia: Clapp, 188.
- Exter terrane, Jurassic, New Mexico: Keyes, 565.
- Fairhaven member, Tertiary, Maryland: Berry, 66.
- Fairmount limestone member, Ordovician, Ohio: Fenneman, 352.
- Fairmount member, Ordovician, Ohio: Braun, 107.
- Fairview formation, Ordovician, Ohio: Braun, 107; Fenneman, 352.
- Fayette formation, Eocene, Texas: Udden *et al.*, 1107.

- Fayette sandstone, Tertiary, Gulf States: Matson, 714.
- Fayette sandstone, Tertiary, Texas: Deussen and Dole, 289.
- Fayetteville shale, Mississippian, Arkansas: Purdue and Miser, 879.
- Fernie formation, Jurassic, Alberta: McLearn, 683.
- Fernie formation, Jurassic, British Columbia: MacKenzie, 678.
- Fernie shales, Jurassic, Alberta: Sinclair, 1000.
- Fernvale limestone, Ordovician, Arkansas: Purdue and Miser, 879.
- Ferron sandstone member, Cretaceous, Utah: Lupton, 660.
- Fierro limetone, Carboniferous, New Mexico: Paige, 824.
- Finlay formation, Cretaceous, Texas: Udden *et al.*, 1107.
- Five Islands volcanics, Triassic, Nova Scotia and New Brunswick: Powers, 857a.
- Flambeau quartzite, pre-Cambrian, Wisconsin: Hotchkiss *et al.*, 489.
- Flathead quartzite, Cambrian, Montana: Walcott, 1146.
- Flat Rock dolomite, Devonian, Michigan and Ontario: Stauffer, 1038.
- Fleming formation, Miocene-Pliocene, Texas: Udden *et al.*, 1107.
- Foraker limestone, Carboniferous, Oklahoma: Heald, 441.
- Forbes limestone, Carboniferous, Iowa: Smith, 1009, 1010.
- Forelle(?), limestone, Carboniferous, Wyoming: Darton, 259.
- Fort Hall formation, Triassic, Idaho: Mansfield, 693.
- Fort Union formation, Tertiary, Montana: Calvert, 163; Rowe and Wilson, 925.
- Fort Union formation, Tertiary, Saskatchewan: Rose, 922.
- Fort Union formation, Tertiary (Eocene), South Dakota: Winchester *et al.*, 1248.
- Fort Worth limestone, Cretaceous, Texas: Udden *et al.*, 1107.
- Fountain formation, Pennsylvanian, Colorado: Finlay, 357.
- Fox Hills sandstone, Cretaceous, Colorado: Finlay, 357.
- Fox Hills sandstone, Cretaceous, Saskatchewan: Rose, 922.
- Fox Hills sandstone, Cretaceous, South Dakota: Winchester *et al.*, 1248.
- Francoisian series, pre-Cambrian, Missouri: Keyes, 565.
- Franconia sandstone, Cambrian, Minnesota: Sardeson, 937.
- Frankfort slate, Ordovician, New York: Foerste, 365.
- Fredericksburg division, Cretaceous, Texas: Udden *et al.*, 1107.
- Fredericksburg group, Cretaceous, Texas: Matson, 712.
- Fredericksburg terrane, Cretaceous, New Mexico: Keyes, 565.
- Fredericktown terrane, Cambrian, Missouri: Keyes, 565.
- Fredonia, Mississippian, Illinois: Brokaw, 111.
- Freeport (Lower) sandstones, Pennsylvanian, West Virginia: Reger, 892.
- Freeport (Upper) limestone, Pennsylvanian, West Virginia: Reger, 892.
- Freeport (Upper) sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Frio clay, Tertiary, Texas: Deussen and Dole, 289.
- Frio formation, Eocene, Texas: Udden *et al.*, 1107.
- Fruendosa terrane, Ordovician, New Mexico: Keyes, 565.
- Frontier formation, Cretaceous, Wyoming: Hares, 424; Lupton, 659.
- Frontier sandstones, Cretaceous, Wyoming: Ziegler, 1275.
- Fruitland formation, New Mexico: Bauer, 52.
- Fusselman limestones, Silurian, New Mexico: Darton, 258; Paige, 824.
- Fusselman limestone, Silurian, Texas: Udden *et al.*, 1107.
- Fusselman limestones, Silurian, New Mexico: Keyes, 565.
- Gabriola formation, Cretaceous, British Columbia: Clapp, 188.
- Galena dolomite, Ordovician, Illinois: Trowbridge and Shaw, 1090.
- Galena dolomite, Ordovician, Illinois and Iowa: Shaw and Trowbridge, 982.
- Galena formation, Ordovician, Iowa: Howell, 492.
- Galena limestone, Ordovician, Minnesota: Sardeson, 937.
- Galena-Platteville limestones, Ordovician, Wisconsin: Weidman and Schultz, 1181.
- Galisteo terrane, Tertiary, New Mexico: Keyes, 565.
- Gallegos terrane, Carboniferous, New Mexico: Keyes, 565.
- Gallinas terrane, Cretaceous, New Mexico: Keyes, 565.
- Gannett group, Cretaceous(?), Idaho: Mansfield and Roundy, 698.
- Gaptank formation, Pennsylvanian, Texas: Udden *et al.*, 1107.
- Garnuan series, pre-Cambrian, New Mexico: Keyes, 565.
- Garrett terrane, Cretaceous, New Mexico: Keyes, 565.
- Gatun formation, Oligocene, Canal Zone: MacDonald, 671.
- Genesee black shales, Devonian, Maryland: Grimsley, 416.
- George River series, pre-Cambrian, Nova Scotia: Woodman, 1258.
- Georgetown formation, Cretaceous, Texas: Udden *et al.*, 1107.
- Glan series, Quaternary, New Mexico: Keyes, 565.
- Gilbert (Lower) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.

- Gilbert (Upper) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Gilboy sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Gilliam formation, Permian, Texas: Udden *et al.*, 1107.
- Gladeville sandstone, Carboniferous, Virginia: Hinds, 467.
- Glance conglomerate, Cretaceous, Arizona: Bonillas *et al.*, 90.
- Glen Rose formation, Cretaceous, Texas: Udden *et al.*, 1107.
- Glen Rose limestone, Cretaceous, Texas: Matson, 712.
- Glorietta terrane, Cretaceous, New Mexico: Keyes, 565.
- Golconda limestone, Mississippian, Illinois: Brokaw, 111.
- Goodland limestone, Cretaceous, Louisiana: Matson, 711.
- Goodnight terrane, Tertiary, Kansas: Keyes, 565.
- Goodridge formation, Pennsylvanian, Utah: Gregory, 405.
- Goodsir shale, Cambrian and Ordovician, British Columbia: Burling, 133.
- Goweran series, Silurian, Missouri: Keyes, 565.
- Gowanda formation, pre-Cambrian, Ontario: Collins, 220.
- Grafton sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Grainger shale, Carboniferous, Virginia: Hinds, 467.
- Grande terrane, Carboniferous, New Mexico: Keyes, 565.
- Grand Gulf formation, Cretaceous, Mississippi: Logan, 650.
- Grand Tower terrane, Devonian, Missouri: Keyes, 565.
- Graneros shale, Cretaceous, Colorado: Finlay, 357.
- Grapevine sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Graphic terrane, pre-Cambrian, New Mexico: Keyes, 565.
- Grayson marls, Cretaceous, Texas: Udden *et al.*, 1107.
- Greene formation, Permian, Ohio: Stauffer, 1039.
- Greenfield dolomite, Silurian, Ohio: Prosser, 870.
- Greenfield member of Monroe formation, Ohio: Napper, 786.
- Greenhorn limestone, Cretaceous, Colorado: Finlay, 357.
- Green Pond conglomerate, Silurian, New Jersey: Schuchert, 961.
- Green River formation, Eocene, Colorado, Utah, and Wyoming: Winchester, 1247.
- Green River (?) formation, Tertiary, Utah: Lupton, 660.
- Green River formation, Tertiary, Utah: Robinson, 913.
- Grenville formation, pre-Cambrian, Quebec: Dresser, 313.
- Grenville limestone, pre-Cambrian, New York: Martin, 707.
- Grenville series, pre-Cambrian, New York: Martin, 707.
- Grenville series, pre-Cambrian, New York: Miller, 766, 767.
- Grenville series, pre-Cambrian, Ontario: Baker, 29.
- Grenville series, pre-Cambrian, Quebec: Wilson, 1243.
- Greybull sand, Cretaceous, Wyoming: Lupton, 659.
- Greyson shales, Algonkian, Montana: O'Connell, 802.
- Guadaloupan series, Carboniferous, New Mexico: Keyes, 565.
- Gulf series, Cretaceous, Louisiana: Matson, 711.
- Guyandot sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Guyandot (Lower) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Gym limestone, Carboniferous, New Mexico: Darton, 258.
- Haida formation, Cretaceous, British Columbia: MacKenzie, 679.
- Hale formation, Pennsylvanian, Arkansas: Purdue and Miser, 879.
- Hamilton beds, Devonian, Ohio: Stauffer, 1040.
- Hamilton formation, Devonian, West Virginia: Grimsley, 416.
- Hamilton shale formation, Devonian, Wisconsin: Weldman and Schultz, 1181.
- Hampton shale, Cambrian, Tennessee: Jenkins, 514.
- Harding sandstone, Ordovician, Colorado: Finlay, 357.
- Hardinsburg sandstone, Mississippian, Illinois: Brokaw, 111.
- Harpers shale, Cambrian, West Virginia: Grimsley, 416.
- Harvey conglomerate sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Haslam formation, Cretaceous, British Columbia: Clapp, 188.
- Hastings series, pre-Cambrian, Great Lakes region: Lawson, 620.
- Hatchelgbee formation, Tertiary, Gulf States: Berry, 63.
- Hattiesburg clay, Tertiary, Gulf States: Matson, 714.
- Hawkins terrane, Cambrian, New Mexico: Keyes, 565.
- Haymond formation, Pennsylvanian, Texas: Udden *et al.*, 1107.
- Hays terrane, Cretaceous, Kansas: Keyes, 565.
- Hazelton formation, Jurassic, British Columbia: MacKenzie, 680.
- Hedges shale, Carboniferous, West Virginia: Grimsley, 416.
- Helderberg formation, Devonian, West Virginia: Grimsley 416.

- Helderbergian series, Devonian, Missouri: Keyes, 565.
- Helderbergian series, Devonian, New York: Schuchert, 961.
- Helena limestone, Algonkian, Montana: Walcott, 1146.
- Hernshaw sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Hickory sandstone, Cambrian, Texas: Udden *et al.*, 1107.
- Higham grit member, Triassic or Jurassic, Idaho: Mansfield, 693.
- High Falls shale, Silurian, New York: Schuchert, 961.
- Hillsboro sandstone, Silurian, Ohio: Prosser, 869, 870.
- Hoh formation, Jurassic (?), Washington: Weaver, 1176.
- Holtsclaw sandstone, Mississippian, Kentucky: Butts, 150.
- Homewood sandstone, Carboniferous, West Virginia: Krebs and Teets, 602; Reger, 892.
- Honna formation, Cretaceous, British Columbia: MacKenzie, 679.
- Horsethief sandstone, Cretaceous, Montana: Stebinger, 1041.
- Houten terrane, Tertiary, New Mexico: Keyes, 565.
- Hudson River group, Ordovician, New York: Foerste, 365.
- Hudson River series, Ordovician, New York: Schuchert, 961.
- Hueco limestone, Pennsylvanian, Texas: Udden *et al.*, 1107.
- Hundred sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Huron shale, Devonian, Ohio: Stauffer, 1040.
- Hypozolc, pre-Cambrian: Schuchert, 962.
- Iaegar (Lower) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Iaegar (Lower) shale, Carboniferous, West Virginia: Krebs and Teets, 602.
- Iaegar (Middle) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Iaegar (Upper) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Idaho Springs formation, pre-Cambrian, Colorado: Bastin and Hill, 51.
- Ilo formation, Cretaceous, Wyoming: Hintze, 468.
- Index granodiorite, Jurassic, Washington: Smith, 1022.
- Index granodiorite, Jurassic or Cretaceous, Washington: Weaver, 1176.
- Jacalitos formation, Pliocene, California: Nomland, 795, 796.
- Jackson formation, Tertiary, Arkansas: Stephenson and Crider, 1047.
- Jackson formation, Tertiary, Gulf States: Matson, 714.
- Jackson formation, Tertiary, Mississippi: Hopkins, 483.
- Jackson group, Eocene, Georgia: Brantly, 105.
- Jackson marls, Cretaceous, Mississippi: Logan, 650.
- Jackson stage, Eocene, Texas: Udden *et al.*, 1107.
- Jane Lew sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Jasper limestone, Ordovician, Arkansas: Purdue and Miser, 879.
- Jennings formation, Devonian, West Virginia: Grimsley, 416.
- Joachim limestone, Ordovician, Arkansas: Purdue and Miser, 879.
- Joachim terrane, Ordovician, Missouri: Keyes, 565.
- John Day formation, Tertiary, Oregon: Collier, 218; Williams, 1229.
- Jollytown sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Jordan sandstone, Cambrian, Minnesota: Sardeson, 937.
- Jornadan series, Quaternary, New Mexico: Keyes, 565.
- Juana Diaz shale, Tertiary, Porto Rico: Reeds, 891.
- Juniata formation, Ordovician, Pennsylvania: Schuchert, 961.
- Kalibab limestone, Pennsylvanian, Arizona: Gregory, 405; Ransome, 881.
- Kamishak chert, Triassic, Alaska: Martin, 705.
- Kamloops volcanic group, Miocene, British Columbia: Drysdale, 316.
- Kanawha black flint, Carboniferous, West Virginia: Krebs and Teets, 602; Reger, 892.
- Kanawha granite, Carboniferous, West Virginia: Krebs and Teets, 602.
- Kano quartz diorite, Jurassic (?), British Columbia: MacKenzie, 679.
- Kansan drift, Pleistocene, Iowa: Leighton, 626.
- Kansan drift, Quaternary, Minnesota: Sardeson, 937.
- Keechelus series, Tertiary, Washington: Smith, 1022.
- Keefer sandstone, Silurian, West Virginia: Grimsley, 416.

- Keweenaw, pre-Cambrian, Ontario: Baker, 29; Knight, 585.
 Keyser formation, Devonian, Pennsylvania: Schuchert, 961.
 Keyser member, Devonian, West Virginia: Grimsley, 410.
 Keystone sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
 Kiamitia clays, Cretaceous, Texas: Udden *et al.*, 1107.
 Kickapoo marls, Cretaceous, Texas: Udden *et al.*, 1107.
 Killarney granite, pre-Cambrian, Ontario: Collins, 220.
 Kingsdown terrane, Pleistocene, Kansas: Keyes, 565.
 Kings River sandstone member, Ordovician, Arkansas: Purdue and Miser, 879.
 Kiowa terrane, Cretaceous, Kansas: Keyes, 565.
 Kiowa terrane, Cretaceous, New Mexico: Keyes, 565.
 Kirtland shale, New Mexico: Bauer, 52.
 Kishineva formation, Eocene (?), British Columbia: MacKenzie, 678.
 Knob Lick terrane, pre-Cambrian, Missouri: Keyes, 565.
 Kokomo water lime, Silurian, Indiana: O'Connell, 892.
 Kootenai formation, Cretaceous, Montana: Barnett, 38.
 Kootenay formation, Cretaceous, Montana: Stebinger, 1041, 1042.
 Kootenay formation, Cretaceous, Alberta: Sinclair, 1000.
 Kootenay formation, Cretaceous, British Columbia: MacKenzie, 678.
 Kootenay formation, Jurassic, Alberta: McLearn, 683.
 Laberge series, Cretaceous or Jurassic, Yukon: Cairnes, 159.
 Lackawaxen conglomerate, Devonian, West Virginia: Grimsley, 416.
 Ladronesian series, Carboniferous, New Mexico: Keyes, 565.
 Lafayette formation, Pleistocene, Texas: Udden *et al.*, 1107.
 Lafayette formation, Tertiary, Arkansas: Stephenson and Crider, 1047.
 Lagarto formation, Pliocene, Texas: Udden *et al.*, 1107.
 Lagrange formation, Tertiary, Tennessee: Purdue, 877.
 La Jara terrane, Cretaceous, New Mexico: Keyes, 565.
 Lake Valley limestone, Carboniferous, New Mexico: Darton, 258.
 Lake Valley terrane, Carboniferous, New Mexico: Keyes, 565.
 Lance formation, Cretaceous or Tertiary, Montana: Rowe and Wilson, 925.
 Lanoria quartzite, pre-Cambrian, Texas: Udden *et al.*, 1107.
 Lapara formation, Miocene, Texas: Udden *et al.*, 1107.
 La Plata group, Jurassic, Arizona, Utah, and New Mexico: Gregory, 405.
 La Plata sandstone, Jurassic, Utah: Lupton, 660.
 La Plata terrane, Jurassic, New Mexico: Keyes, 565.
 Laramian series, Cretaceous, New Mexico: Keyes, 565.
 Laramie formation, Cretaceous, Colorado: Finlay, 357.
 Las Cascadas agglomerate, Canal Zone: MacDonald, 671.
 Latonia shale, Ordovician, Ohio: Fenneman, 352.
 Laurel limestone, Silurian, Ohio and Indiana: Moser, 870.
 Laurentian, pre-Cambrian, Ontario: Baker, 29.
 Laurentian, pre-Cambrian, Quebec: Dresser, 313.
 Laurentian revolution, pre-Cambrian: Schuchert, 962.
 Lelo shale member, Cretaceous or Tertiary, Montana: Rowe and Wilson, 925.
 Leda or Champlain clays, Pleistocene, Canada: Johnstone, 533.
 Lee formation, Carboniferous, Virginia: Hinds, 467.
 Leonard formation, Permian, Texas: Udden *et al.*, 1107.
 Leray limestone, Ordovician, Ontario: Baker, 29; Kindle, 577.
 Leray limestone, Ordovician, New York: Miller, 766.
 Le Roux terrane, Triassic, New Mexico: Keyes, 565.
 Le Sueur terrane, Cambrian, Missouri: Keyes, 565.
 Lewis shale, New Mexico: Bauer, 52.
 Lewis terrane, Cretaceous, New Mexico: Keyes, 565.
 Lewisville beds, Cretaceous, Texas: Udden *et al.*, 1107.
 Liberty limestone, Ordovician, Ohio: Fenneman, 352.
 Lincoln formation, Oligocene, Washington: Weaver, 1176.
 Linley conglomerate, Tertiary, Montana: Calvert, 163.
 Lisbon series, New Hampshire: Lahee, 607.
 Little Falls dolomite, Cambrian, New York: Miller, 766.
 Livingston formation, Cretaceous, Montana: Calvert, 163.
 Lizzie gravels, Pleistocene, Texas: Udden *et al.*, 1107.
 Llano Estacado terrane, Tertiary, New

- Longfellow limestone, Ordovician, Arizona : Ransome, 881.
- Longwood shales, Silurian, New York and New Jersey : Schuchert, 961.
- Lorrain quartzite, pre-Cambrian, Ontario : Collins, 220.
- Lorraine formation, Ordovician, Ontario and Quebec : Foerste, 365.
- Lorraine formation, Ordovician, Pennsylvania : Schuchert, 961.
- Lorraine shales, Ordovician, New York : Foerste, 365.
- Loudoun formation, Cambrian, West Virginia : Grimsley, 416.
- Loupian series, Tertiary, Kansas : Keyes, 565.
- Lowville limestone, Ordovician, New York : Miller, 766.
- Lowville limestone, Ordovician, Ontario : Baker, 29 ; Kindle, 577.
- Lucas dolomite, Devonian, Michigan and Ohio : Stauffer, 1038.
- Ludlow lignite member, Tertiary (?), South Dakota : Winchester *et al.*, 1248.
- Lunasan series, Carboniferous, New Mexico : Keyes, 565.
- Lyman schists, New Hampshire : Lahee, 607.
- Lyman series, New Hampshire : Lahee, 607.
- Lykins formation, Permian (?), Colorado : Finlay, 357.
- Lyons sandstone, Pennsylvanian, Colorado : Finlay, 357.
- Lytton formation, Eocene, Texas : Udden *et al.*, 1107.
- McBean formation, Eocene, Georgia : Brantly, 105.
- McCarthy formation, Triassic, Alaska : Martin, 705 ; Moffit, 769.
- McCune terrane, Ordovician, Missouri : Keyes, 565.
- McElmo formation, Jurassic (?), Arizona, Utah, and New Mexico : Gregory, 405.
- McElmo terrane, Jurassic, New Mexico : Keyes, 565.
- McElmo formation, Jurassic (?), Utah : Lupton, 660.
- McKenzie formation, Silurian, West Virginia : Grimsley, 416.
- McKissick's Grove shales, Carboniferous, Iowa : Smith, 1009.
- McLeansboro formation, Pennsylvanian, Illinois : Cady, 156 ; Rich, 900 ; Savage, 940 ; Young, 1272.
- McMicken member, Ordovician, Ohio : Braun, 107.
- McMillan formation, Ordovician, Ohio : Braun, 107 ; Fenneman, 352.
- McNairy sand member, Cretaceous, Tennessee : Berry, 74.
- Maderan series, Carboniferous, New Mexico : Keyes, 565.
- Madison beds, Ordovician, Indiana : Culbertson, 239.
- Madison limestone, Cambrian, Wisconsin : Shipton, 994.
- Madison limestone, Carboniferous, Montana : Haynes, 440 ; Walcott, 1146.
- Madison limestone, Carboniferous, Wyoming : Mansfield, 694.
- Madison limestone, Mississippian, Montana : Barnett, 38.
- Magdalena formation, Carboniferous, New Mexico : Darton, 258.
- Magothy formation, Cretaceous, Atlantic coast : Clark *et al.*, 198.
- Magothy formation, Cretaceous, Maryland : Clark, 195.
- Mahoning sandstone, Carboniferous, Ohio : Condit, 223.
- Mahoning sandstones, Pennsylvanian, West Virginia : Reger, 892.
- Mainstreet limestone, Cretaceous, Texas : Udden *et al.*, 1107.
- Malone formation, Jurassic, Texas : Udden *et al.*, 1107.
- Maloney series, Ordovician, Washington : Smith, 1022.
- Manasquan formation, Cretaceous, Atlantic coast : Clark *et al.*, 198.
- Mancos shale, Cretaceous, Arizona and New Mexico : Gregory, 405.
- Mancos shale, Cretaceous, Utah : Lupton, 660.
- Mancos shale, Cretaceous, Wyoming : Ziegler, 1275.
- Mangas terrane, Cambrian, New Mexico : Keyes, 565.
- Manitou limestone, Ordovician, Colorado : Finlay, 357.
- Mannington sandstone, Pennsylvanian, West Virginia : Reger, 892.
- Manzano terrane, Carboniferous, New Mexico : Keyes, 565.
- Maquoketa beds, Ordovician, Iowa : Slocom, 1007.
- Maquoketa shale, Illinois : Savage, 944.
- Maquoketa shale, Ordovician, Illinois : Trowbridge and Shaw, 1090.
- Maquoketa shale, Ordovician, Illinois and Iowa : Shaw and Trowbridge, 982.
- Maquoketan series, Ordovician, Missouri : Keyes, 565.
- Marathon series, Ordovician, Texas : Udden *et al.*, 1107.
- Maravillas chert, Ordovician and Silurian, Texas : Udden *et al.*, 1107.
- Marble Falls limestone, Pennsylvanian, Texas : Udden *et al.*, 1107.
- Marcellus formation, Devonian, West Virginia : Grimsley, 416.
- Marcellus shale, Devonian, New York : Smith, 1008.
- Marianna limestone, Tertiary, Florida : Matson, 714.
- Marietta (Lower) sandstone, Pennsylvanian, West Virginia : Reger, 892.
- Marietta (Upper) sandstone, Pennsylvanian, West Virginia : Reger, 892.
- Maricopa shale, Tertiary, California : English, 344.
- Marks Head marl, Miocene, Georgia : Brantly, 105.

- Marlbrook marl**, Cretaceous, Louisiana: Matson, 711.
Marlbrook marls, Cretaceous, Texas: Udden *et al.*, 1107.
Marsh shale, Algonkian, Montana: Walcott, 1146.
Martin limestone, Devonian, Arizona: Bonillas *et al.*, 90; Ransome, 881.
Martinian series, Devonian, New Mexico: Keyes, 565.
Martinsburg shale, Ordovician, West Virginia: Grimsley, 416.
Mascall formation, Miocene, Oregon: Collier, 218.
Masset formation, Tertiary, British Columbia: MacKenzie, 679.
Matawan formation, Cretaceous, Atlantic coast: Clark *et al.*, 198.
Matawan formation, Cretaceous, Maryland: Clark, 195.
Matewan sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
Maude formation, Jurassic, British Columbia: MacKenzie, 679.
Maya terrane, Tertiary, New Mexico: Keyes, 565.
Mayville limestone, Silurian, Wisconsin: Savage, 944.
Mayville group, Ordovician, Ohio: Fenneman, 352.
Maxville limestone, Mississippian, Ohio: Lamb, 609.
Maxwell terrane, Tertiary, New Mexico: Keyes, 565.
Meade terrane, Pleistocene, Kansas: Keyes, 565.
Meagher limestone, Cambrian, Montana: Walcott, 1146.
Medina formation, Silurian, West Virginia: Grimsley, 416.
Medina quartzites, Silurian, Pennsylvania: Schuchert, 961.
Medina series, Silurian, New York: Schuchert, 961.
Medina (white) sandstone, Silurian, West Virginia: Grimsley, 416.
Meeteetse formation, Cretaceous, Wyoming: Hintze, 468.
Menard formation, Mississippian, Illinois: Brokaw, 111.
Mendez marls, Eocene, Mexico: Huntley, 503.
Mendota limestone, Cambrian, Wisconsin: Shipton, 994.
Mentor terrane, Cretaceous, Kansas: Keyes, 565.
Merced series, Pliocene, California: Martin, 704.
Mesaverde formation, Cretaceous, Arizona: Mesa Verde terrane, Cretaceous, New Mexico: Keyes, 565.
Mescal limestone, Cambrian (?), Arizona: Ransome, 881.
Midway formation, Eocene, Georgia: Brantly, 105.
Midway formation, Eocene, Texas: Matson, 712.
Midway formation, Tertiary, Arkansas: Stephenson and Crider, 1047.
Midway formation, Tertiary, Louisiana: Matson, 711.
Midway formation, Tertiary, Gulf States: Berry, 63.
Midway stage, Eocene, Texas: Udden *et al.*, 1107.
Milesburg formation, Devonian, Pennsylvania: Schuchert, 961.
Millican formation, pre-Cambrian, Texas: Udden *et al.*, 1107.
Mimbresan series, Ordovician, New Mexico: Keyes, 565.
Missesotan series, Ordovician, Missouri: Keyes, 565.
Mississagi quartzite, pre-Cambrian, Ontario: Collins, 220.
Mississippian series, Carboniferous, Missouri: Keyes, 565.
Mississippian series, Carboniferous, Virginia: Hinds, 467.
Missourian series, Carboniferous, Kansas: Keyes, 565.
Missourian series, Carboniferous, Missouri: Keyes, 565.
Modoc limestone, Carboniferous, Arizona: Ransome, 881.
Modoc terrane, Carboniferous, New Mexico: Keyes, 565.
Moencopi formation, Permian (?), Utah and Arizona: Gregory, 405.
Mohawkian series, Ordovician, Missouri: Keyes, 565.
Monitor ("Logan") sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
Monmouth formation, Cretaceous, Atlantic coast: Clark *et al.*, 198.
Monmouth formation, Cretaceous, Maryland: Clark, 195.
Monongahela formation, Carboniferous, Ohio: Condit, 223.
Monongahela series, Pennsylvanian, West Virginia: Reger, 892.
Monroe formation, Silurian, Ohio: Prosser, 869, 870.
Montana granite, Cretaceous, Colorado: Finlay, 357.
Montanan series, Cretaceous, Kansas: Keyes, 565.
Montanan series, Cretaceous, New Mexico:

- Montosa terrane**, Carboniferous, New Mexico: Keyes, 565.
- Montoya limestone**, Ordovician, New Mexico: Darton, 258; Paige, 824.
- Montoya limestone**, Ordovician, Texas: Udden *et al.*, 1107.
- Montoyan series**, Ordovician, New Mexico: Keyes, 565.
- Moose River sandstone**, Devonian, Maine: Williams, 1226.
- Morales member**, Tertiary, California: English, 344.
- Morenci shale**, Devonian (?), Arizona: Ransome, 881.
- Morgantown sandstone**, Pennsylvanian, West Virginia: Reger, 892.
- Morita limestone**, Cretaceous, Arizona: Bonillas *et al.*, 90.
- Morrison formation**: Cretaceous (?), Wyoming: Ziegler, 1275.
- Morrison formation**, Cretaceous, Rocky Mountain region: Mook, 776.
- Morrison (?) formation**, Cretaceous (?), Montana: Barnett, 38.
- Morrison formation**: Cretaceous (?), Wyoming: Hares, 424.
- Morrison formation**, Jurassic or Cretaceous, Colorado: Finlay, 357.
- Morrison formation**, Jurassic or Cretaceous, Wyoming: Darton, 259.
- Morrisonian series**, Jurassic, Kansas: Keyes, 565.
- Morrisonian series**, Jurassic, New Mexico: Keyes, 565.
- Morrow group**, Pennsylvanian, Arkansas: Purdue and Miser, 879.
- Mosca terrane**, Carboniferous, New Mexico: Keyes, 565.
- Mottville member**, Devonian, New York: Smith, 1008.
- Mount Auburn member**, Ordovician, Ohio: Braun, 107.
- Mount Auburn shale**, Ordovician, Ohio: Fenneman, 352.
- Mount Hope formation**, Ordovician, Ohio: Braun, 107.
- Mount Hope member**, Ordovician, Ohio: Fenneman, 352.
- Mount Rosa granite**, pre-Cambrian, Colorado: Finlay, 357.
- Mount Selman formation**, Eocene, Texas: Udden *et al.*, 1107.
- Mount Selman formation**, Tertiary, Texas: Deussen and Dole, 289.
- Mount Stevens group**, pre-Cambrian (?), Yukon: Cairnes, 159.
- Mowry shale**, Cretaceous, Wyoming: Hares, 424; Lupton, 659; Ziegler, 1275.
- Muav limestone**, Cambrian, Arizona: Ransome, 881.
- Mural limestone**, Cretaceous, Arizona: Bonillas *et al.*, 90.
- Myers red shale**, Carboniferous, West Virginia: Grimsley, 416.
- Myrick formation**, Eocene, Texas: Udden *et al.*, 1107.
- Myrick formation**, Tertiary, Texas: Deussen and Dole, 289.
- Myrtle formation**, Cretaceous, California: Martin, 704.
- Myrtle formation**, Cretaceous, Oregon: Butler and Mitchell, 147.
- Nacatoch sand (?)**, Cretaceous, Arkansas: Stephenson and Crider, 1047.
- Nacatoch sand**, Cretaceous, Louisiana: Matson, 711.
- Nacatoch sand**, Cretaceous, Texas: Udden *et al.*, 1107.
- Nacatoch sand member**, Cretaceous, Texas: Matson, 712.
- Nacimientan series**, Tertiary, New Mexico: Keyes, 565.
- Naco limestone**, Pennsylvanian, Arizona: Bonillas *et al.*, 90; Ransome, 881.
- Naheola formation**, Tertiary, Gulf States: Berry, 63.
- Nalad terrane**, Silurian, New Mexico: Keyes, 565.
- Nanafalla formation**, Tertiary, Gulf States: Perry, 63.
- Nanaimo series**, Cretaceous, British Columbia: Clapp, 188.
- Naugatuck sandstone**, Carboniferous, West Virginia: Krebs and Teets, 602.
- Navarro formation**, Cretaceous, Texas: Matson, 712; Udden *et al.*, 1107.
- Navajo sandstone**, Jurassic, Arizona, Utah, and New Mexico: Gregory, 405.
- Navajo terrane**, Cretaceous, New Mexico: Keyes, 565.
- Nebraskan till**, Pleistocene, Iowa: Leighton, 626.
- Neva limestone**, Carboniferous, Oklahoma: Heald, 441.
- New Albany black shale**, Devonian, Indiana: Culbertson, 239.
- Newark group**, Triassic, Nova Scotia and New Brunswick: Powers, 857a.
- Newcastle formation**, Cretaceous, British Columbia: Clapp, 188.
- New Haven limestone**, Pennsylvanian, Illinois: Cady, 156; Young, 1272.
- Newman limestone**, Carboniferous, Virginia: Hinds, 467.
- New Providence shale**, Mississippian, Kentucky: Butts, 150.
- New Richmond sandstone**, Ordovician, Iowa: Howell, 492.
- New River group**, Carboniferous, West Virginia: Krebs and Teets, 602.
- New Scotland member**, Devonian, West Virginia: Grimsley, 416.
- Niagara dolomite**, Silurian, Illinois and Iowa: Shaw and Trowbridge, 982.
- Niagara limestone**, Silurian, Wisconsin: Weidman and Schultz, 1181.
- Niagara (McKenzie) formation**, Silurian, West Virginia: Grimsley, 416.
- Niagaran dolomite**, Silurian, Illinois: Trowbridge and Shaw, 1090.
- Niagaran series**, Silurian, Missouri: Keyes, 565.
- Nicola group**, Jura-Triassic, British Columbia: Drysdale, 316.
- Nikolai greenstone**, Alaska: Moffit, 769.

- Nikolai greenstone, Triassic or Permian, Alaska: Martin, 705.
- Ninos terrane, pre-Cambrian, New Mexico: Keyes, 565.
- Niobrara formation, Cretaceous, Colorado: Finlay, 357.
- Niobrara formation, Cretaceous, Wyoming: Ziegler, 1275.
- Niobrara shale, Cretaceous, Wyoming: Darton, 259.
- Nishnabotna sandstone, Carboniferous, Iowa: Smith, 1010.
- Nishnabotna terrane, Cretaceous, Missouri: Keyes, 565.
- Nizina limestone, Triassic, Alaska: Martin, 705.
- Noix oolite, Silurian, Missouri: Rowley, 926.
- Nonesuch formation, pre-Cambrian, Wisconsin: Weldman and Schultz, 1181.
- Normanskill sandstones, Ordovician, New York: O'Connell, 802.
- North Fork shale, Carboniferous, West Virginia: Krebs and Teets, 602.
- North Mountain basalt, Triassic, Nova Scotia and, New Brunswick: Powers, 857a.
- Northumberland formation, Cretaceous, British Columbia: Clapp, 188.
- Norton formation, Carboniferous, Virginia: Hinds, 467.
- Nugget sandstone, Jurassic or Triassic, Idaho: Mansfield, 693.
- Nugget sandstone, Jurassic or Triassic, Wyoming: Mansfield, 694.
- Nuttall (Lower) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Oak Creek formation, Miocene, South Dakota: Troxell, 1093.
- Oak Grove sand, Tertiary, Florida: Berry, 65.
- Oakville formation, Miocene, Texas: Udden *et al.*, 1107.
- Oakville sandstone, Tertiary, Texas: Deussen and Dole, 289.
- Ocala formation, Eocene, Georgia: Brantly, 105.
- Ocala limestone, Tertiary, Florida: Matson, 714.
- Octoraro schist, Ordovician, Pennsylvania: Bliss and Jonas, 88.
- Ogalalla terrane, Tertiary, Kansas: Keyes, 565.
- Ohara, Mississippian, Illinois: Brokaw, 111.
- Ohio shale, Ohio: Prosser, 869.
- Ojo Alamo sandstone, New Mexico: Bauer, 52.
- Okefenokee formation, Pleistocene, Georgia: Brantly, 105.
- Oklahoman series, Carboniferous, Kansas: Keyes, 565.
- Oreota dolomite, Ordovician, Iowa: Howell, 492.
- Oreota dolomite, Ordovician, Minnesota: Sardeson, 937.
- Olentangy shale, Devonian, Ohio: Stauffer, 1040.
- Oriskanian series, Devonian, Missouri: Keyes, 565.
- Oriskany sandstone formation, Devonian, West Virginia: Grimsley, 416.
- Orlando limestone, Pennsylvanian, West Virginia: Reger, 892.
- Osgood beds, Silurian, Ohio and Indiana: Prosser, 870.
- Osgood shale, Silurian, Indiana: Culbertson, 239.
- Ottertail limestone, Cambrian, Alberta: Burling, 133.
- Outer formation, pre-Cambrian, Wisconsin: Weldman and Schultz, 1181.
- Ozarkian series, Cambrian, Missouri: Keyes, 565.
- Palestine sandstone, Mississippian, Illinois: Brokaw, 111.
- Palestine sandstone, Mississippian, Illinois and Kentucky: Weller, 1185.
- Palomasan series, Quaternary, New Mexico: Keyes, 565.
- Paluxy formation, Cretaceous, Texas: Udden *et al.*, 1107.
- Paluxy sand, Cretaceous, Texas: Matson, 712.
- Pamela formation, Ordovician, Ontario: Baker, 29; Kindle, 577.
- Panama formation, Oligocene, Canal Zone: MacDonald, 671.
- Panhandle beds, Miocene, Texas: Udden *et al.*, 1107.
- Panther sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Park shale, Cambrian, Montana: Walcott, 1146.
- Park City formation, Carboniferous, Wyoming: Condit, 224.
- Parkhead sandstone, Devonian, West Virginia: Grimsley, 416.
- Pascagoula clay, Tertiary, Gulf States: Matson, 714.
- Pascagoula formation, Cretaceous, Mississippi: Logan, 650.
- Paskapoo formation, Tertiary, Alberta: Sinclair, 1000.
- Paskapoo formation, Tertiary and Cretaceous, Alberta: Slipper, 1006.
- Patapsco formation, Cretaceous, Maryland: Clark, 195.
- Pato red member, Tertiary, California: Engllsh, 344.
- Patuxent formation, Cretaceous, Maryland: Clark, 195.
- Pawpaw beds, Cretaceous, Texas: Udden *et al.*, 1107.
- Payette formation, Eocene(?), Idaho: Jones, 536.
- Pearlette terrane, Pleistocene, Kansas: Keyes, 565.
- Peay sandstone member, Cretaceous, Wyoming: Lupton, 659.
- Pecosian series, Tertiary, New Mexico: *Keyes, 565*

- Peerless sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Pella beds, Carboniferous, Iowa: Weller and Van Tuyl, 1187.
- Pella limestone, Mississippian, Iowa: Van Tuyl, 1122.
- Pennington shale, Carboniferous, Virginia: Hinds, 487.
- Pennsylvanian series, Carboniferous, Virginia: Hinds, 467.
- Penasco terrane, pre-Cambrian, New Mexico: Keyes, 565.
- Percha shale, Devonian, New Mexico: Darton, 258; Paige, 824.
- Perchan series, Devonian, New Mexico: Keyes, 565.
- Pete terrane, Cretaceous, Kansas: Keyes, 565.
- Peterson limestone, Cretaceous (?), Idaho: Mansfield and Roundy, 698.
- Phosphoria formation, Carboniferous, Wyoming: Mansfield, 694.
- Pictured Cliffs sandstone, New Mexico: Bauer, 52.
- Pictured Cliffs terrane, Cretaceous, New Mexico: Keyes, 565.
- Pierpont sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Pierre shale, Cretaceous, Colorado: Finlay, 357.
- Pierre shale, Cretaceous, Montana: Rowe and Wilson, 925.
- Pierre shale, Cretaceous, Saskatchewan: Rose, 922.
- Pierre shale, Cretaceous, South Dakota: Winchester *et al.*, 1248.
- Pierre shale, Cretaceous, Wyoming: Hintze, 468.
- Pierre formation, Cretaceous, Wyoming: Ziegler, 1275.
- Pikes Peak granite, pre-Cambrian, Colorado: Finlay, 357.
- Pilgrim limestone, Cambrian, Montana: Walcott, 1146.
- Pilot Knob terrane, pre-Cambrian, Missouri: Keyes, 565.
- Pinal schist, pre-Cambrian, Arizona: Bonillas *et al.*, 90; Ransome, 881.
- Pina Vititos terrane, Cretaceous, New Mexico: Keyes, 565.
- Pine Creek limestone, Pennsylvania, West Virginia: Reger, 892.
- Pineville sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Pinkerton sandstone, Carboniferous, West Virginia: Grimsley, 416.
- Pinto limestone, Cretaceous, Texas: Udden *et al.*, 1107.
- Pioneer shale, Cambrian (?), Arizona: Ransome, 881.
- Pitkin limestone, Mississippian, Arkansas: Purdue and Miser, 879.
- Pittsburgh red shale, Pennsylvanian, West Virginia: Reger, 892.
- Pittsburgh (Lower) limestone member, Carboniferous, Ohio: Condit, 223.
- Pittsburgh (Lower) sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Pittsburgh (Upper) limestone, Pennsylvanian, West Virginia: Reger, 892.
- Pittsford shale, Silurian, New York: O'Connell, 802.
- Platte shales, Carboniferous, Iowa: Smith, 1009, 1010.
- Platteville formation, Ordovician, Iowa: Howell, 492.
- Platteville limestone, Ordovician, Illinois: Shaw and Trowbridge, 982; Trowbridge and Shaw, 1090.
- Platteville limestone, Ordovician, Minnesota: Sardeson, 937.
- Platteville-Galena limestone, Ordovician, Illinois: Sauer, 938.
- Plattsburgh limestone, Carboniferous, Iowa: Smith, 1009.
- Pocahontas group, Carboniferous, West Virginia: Krebs and Teets, 602.
- Pocahontas (Lower) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Pocahontas (Upper) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Pocono formation, Carboniferous, West Virginia: Grimsley, 416.
- Poinsettian series, Tertiary, Missouri: Keyes, 565.
- Point Pleasant limestone, Ordovician, Ohio: Fenneman, 352.
- Pokegama quartzite, Algonkian, Minnesota: Wolf, 1253.
- Portage formation, Devonian, West Virginia: Grimsley, 416.
- Porter horizon, Oligocene, Washington: Weaver, 1176.
- Porters Creek formation, Tertiary, Tennessee: Purdue, 877.
- Port Hudson clays, Pleistocene, Texas: Udden *et al.*, 1107.
- Portneuf limestone, Triassic, Idaho: Mansfield, 693.
- Potomac group, Cretaceous, Maryland: Clark, 195.
- Potsdam sandstone, Cambrian, Illinois: Trowbridge and Shaw, 1090.
- Potsdam sandstone, Cambrian, New York: Miller, 766.
- Potsdam sandstone, Cambrian, Wisconsin: Weldman and Schultz, 1181.
- Potsdam series, Cambrian, Ontario: Baker, 29.
- Pottsboro subgroup, Cretaceous, Texas: Udden *et al.*, 1107.
- Pottsville formation, Pennsylvanian, Illinois: Brokaw, 111; Cady, 156; Rich, 900; Savage, 940; Young, 1272.
- Pottsville series, Carboniferous, West Virginia: Krebs and Teets, 602; Reger, 892.
- Powell limestone, Ordovician, Arkansas: Purdue and Miser, 879.
- Prairie du Chien, Ordovician, Illinois: Trowbridge and Shaw, 1090.
- Prairie du Chien formation, Ordovician, Iowa: Howell, 492.
- Prairie du Chien group, Illinois: Sauer, 938.

- Pre-Kansan drift, Quaternary, Minnesota : Sardeson, 937.
- Presidio beds, Cretaceous, Texas : Udden *et al.*, 1107.
- Preston beds, Cretaceous, Texas : Udden *et al.*, 1107.
- Preuss sandstone, Jurassic, Idaho : Mansfield and Roundy, 698.
- Protection formation, Cretaceous, British Columbia : Clapp, 188.
- Proterozoic era, pre-Cambrian : Schuchert, 962.
- Prout limestone, Devonian, Ohio : Stauffer, 1040.
- Puerco formation, New Mexico : Bauer, 52.
- Puerco terrane, Tertiary, New Mexico : Keyes, 565.
- Pulaski shales, Ordovician, New York : Foerste, 365.
- Pulliam formation, Cretaceous, Texas : Udden *et al.*, 1107.
- Purgatoire formation, Cretaceous, Colorado : Finlay, 357.
- Purissima formation, Pliocene, California : Martin, 704.
- Purslane sandstone, Carboniferous, West Virginia : Grimsley, 416.
- Quaco conglomerate, Triassic, Nova Scotia and New Brunswick : Powers, 857a.
- Quadrant formation, Carboniferous, Montana : Haynes, 440 ; Walcott, 1146.
- Quadrant formation, Pennsylvanian (?), Montana : Barnett, 38.
- Queen Charlotte series, Cretaceous, British Columbia : MacKenzie, 679.
- Queen Charlotte Islands formation, Cretaceous, British Columbia : Drysdale, 316.
- Queen City formation, Eocene, Texas : Udden *et al.*, 1107.
- Queenston shales, Ordovician, New York and Ontario : Foerste, 365.
- Quinnimont sandstone, Carboniferous, West Virginia : Krebs and Teets, 602.
- Quitman bed Cretaceous, Texas : Udden *et al.*, 1107.
- Raleigh (Lower) sandstone, Carboniferous, West Virginia : Krebs and Teets, 602.
- Raleigh (Upper) Sandstone, Carboniferous, West Virginia : Krebs and Teets, 602.
- Rancocas formation, Cretaceous, Atlantic coast : Clark *et al.*, 198.
- Rancocas formation, Cretaceous, Maryland : Clark, 195.
- Raritan formation, Cretaceous, Atlantic coast : Clark, *et al.*, 198.
- Raritan formation, Cretaceous, Maryland : Clark, 195.
- Ratonan series, Tertiary, New Mexico : Keyes, 565.
- Rattlesnake beds, Cretaceous, Texas : Udden *et al.*, 1107.
- Rattlesnake formation, Pliocene, Oregon : Collier, 218.
- Red Eagle limestone, Carboniferous, Oklahoma : Heald, 441.
- Redrock Canyon sandstone, Tertiary, California : English, 344.
- Redstone limestone, Pennsylvanian, West Virginia : Reger, 892.
- Redwall limestone, Mississippian, Arizona : Ransome, 881.
- Renault limestone, Mississippian, Illinois : Brokaw, 111.
- Rexmont volcanics, Eocene (?), British Columbia : Drysdale, 316.
- Reynosa formation, Pleistocene, Texas : Udden *et al.*, 1107.
- Richmond formation, Ohio : Braun, 107.
- Richmond formation, Ordovician, Ohio and Indiana : Prosser, 870.
- Richmond formation, Ordovician, Ontario and Quebec : Foerste, 365.
- Richmond formation, Ordovician, Quebec : Dresser, 313.
- Richmond group, Ordovician, Ohio : Fennerman, 352.
- Richmond limestone, Ordovician, Illinois : Sauer, 938.
- Rideau beds, Ordovician, Ontario : Baker, 29 ; Kindle, 577.
- Ripley formation, Cretaceous, Tennessee : Berry, 74 ; Purdue, 877.
- Ripley marls, Cretaceous, Mississippi : Logan, 650.
- Ripleyan series, Cretaceous, Missouri : Keyes, 565.
- Roberval formation, pre-Cambrian, Quebec : Dresser, 313.
- Roclaia terrane, pre-Cambrian, New Mexico : Keyes, 565.
- Rock Creek beds, Pleistocene, Texas : Udden *et al.*, 1107.
- Rockwell formation, Carboniferous, West Virginia : Grimsley, 416.
- Rondout waterlime formation, Silurian, West Virginia : Grimsley, 416.
- Rosewood shale, Mississippian, Kentucky : Butts, 150.
- Rosiclare, Mississippian, Illinois : Brokaw, 111.
- Ross limestone, Triassic, Idaho : Mansfield, 693.
- Royal shale, Carboniferous, West Virginia : Krebs and Teets, 602.
- Rush Run sandstone, Pennsylvanian, West Virginia : Reger, 892.
- Rustler formation, Permian, Texas : Udden *et al.*, 1107.
- Saguenay anorthosite, pre-Cambrian, Quebec : Dresser, 313.
- Ste. Genevieve formation, Carboniferous, Iowa : Weller and Van Tuyl, 1187.
- Ste. Genevieve limestone, Mississippian, Illinois : Rich, 900.
- Ste. Genevieve limestone, Mississippian, Kentucky : Butts, 150.
- St. Joe limestone member, Mississippian, Arkansas : Purdue and Miser, 879.
- St. Lawrence formation, Cambrian, Minnesota : Sardeson, 937.
- St. Louis limestone, Mississippian, Illinois : Rich, 900.
- St. Louis limestone, Carboniferous, Iowa : Weller and Van Tuyl, 1187.

- St. Louis limestone, Mississippian, Iowa, Illinois, and Missouri: Van Tuyl, 1122.
- St. Louis limestone, Mississippian, Kentucky: Butts, 150.
- St. Mary River formation, Cretaceous, Alberta: Stewart, 1051.
- St. Mary River formation, Eocene (?) Montana: Stebinger, 1041.
- St. Peter formation, Ordovician, Iowa: Howell, 492.
- St. Peter sandstone, Illinois: Sauer, 938.
- St. Peter sandstone, Ordovician, Arkansas: Purdue and Miser, 879.
- St. Peter sandstone, Ordovician, Illinois: Trowbridge and Shaw, 1090.
- St. Peter sandstone, Ordovician, Minnesota: Sardeson, 937.
- St. Peter sandstone, Ordovician, Wisconsin: Weldman and Schultz, 1181.
- St. Stephens limestone, Tertiary, Alabama: Matson, 714.
- Salmon River sandstone, Ordovician, New York: Foerste, 365.
- Salt Lake beds, Pliocene, Wyoming: Mansfield, 694.
- Saltsburg sandstone, Pennsylvanian, West Virginia: Reger, 892.
- San Carlos beds, Cretaceous, Texas: Udden *et al.*, 1107.
- Sandia terrane, Carboniferous, New Mexico: Keyes, 565.
- Sandoval terrane, pre-Cambrian, New Mexico: Keyes, 565.
- Sandy Huff shale, Carboniferous, West Virginia: Krebs and Teets, 602.
- San Felipe formation, Mexico: Huntley, 503.
- San Miguel beds, Cretaceous, Texas: Udden *et al.*, 1107.
- Santa Fe terrane, Tertiary, New Mexico: Keyes, 565.
- Santa Margarita formation, Tertiary, California: English, 344.
- Santa Rita series, Silurian, New Mexico: Keyes, 565.
- Santiago chert, Mississippian (?), Texas: Udden *et al.*, 1107.
- Sapello terrane, pre-Cambrian, New Mexico: Keyes, 565.
- Sarten limestone, Cretaceous, New Mexico: Darton, 258.
- Satanka (?) shale, Carboniferous, Wyoming: Darton, 259.
- Satilla formation, Pleistocene, Georgia: Brantly, 105.
- Sawatch sandstone, Cambrian, Colorado: Finlay, 357.
- Sawback formation, Cambrian, Alberta: Allan, 6; Burling, 133.
- Scanlan conglomerate, Cambrian, Arizona: Ransome, 881.
- Schenectady bluestones, Ordovician, New York: O'Connell, 802.
- Scots Bay formation, Triassic, Nova Scotia and New Brunswick: Powers, 857a.
- Seine series, pre-Cambrian, Great Lakes region: Lawson, 620.
- Seine slate, quartzite, and conglomerate, pre-Cambrian, Great Lakes region: Lawson, 620.
- Selkirkic period, pre-Cambrian, Missouri: Keyes, 565.
- Selma chalk, Cretaceous, Mississippi: Logan, 650.
- Selma clay, Cretaceous, Tennessee: Purdue, 877.
- Seneca series, Devonian, Missouri: Keyes, 565.
- Serna terrane, pre-Cambrian, New Mexico: Keyes, 565.
- Serpent quartzite, pre-Cambrian, Ontario: Collins, 220.
- Seth limestone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Sewickley limestone, Pennsylvanian, West Virginia: Reger, 892.
- Sewickley (Lower) sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Sewickley (Upper) sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Sexton terrane, Silurian, Missouri: Keyes, 565.
- Sexton Creek limestone, Silurian, Illinois: Savage, 944.
- Seymour deposits, Pleistocene, Texas: Udden *et al.*, 1107.
- Shady limestone, Cambrian, Tennessee: Jenkins, 514.
- Shafter beds, Cretaceous, Texas: Udden *et al.*, 1107.
- Shakopee dolomite, Ordovician, Iowa: Howell, 402.
- Shakopee dolomite, Ordovician, Minnesota: Sardeson, 937.
- Shandon quartzites, Cambrian, New Mexico: Keyes, 565.
- Shawangunk conglomerate, Silurian, New York: O'Connell, 802.
- Shawangunk formation, Silurian, New York: Schuchert, 961.
- Shegulandah beds, Ordovician, Ontario: Foerste, 365.
- Shenandoah limestone, Cambrian and Ordovician, Pennsylvania: Bliss and Jonas, 88.
- Shinarump conglomerate, Triassic, Arizona and Utah: Gregory, 405.
- Shinarump terrane, Trias, New Mexico: Keyes, 565.
- Shoal Creek limestone, Pennsylvanian, Illinois: Cady, 156; Young, 1272.
- Shoal River marl, Tertiary, Florida: Berry, 65.
- Sierra terrane, Carboniferous, New Mexico: Keyes, 565.
- Silver terrane, Devonian, New Mexico: Keyes, 565.
- Silver Plume granite, pre-Cambrian, Colorado: Bastin and Hill, 51.
- Skeena formation, Cretaceous, British Columbia: MacKenzie, 680.
- Skidgate formation, Cretaceous, British Columbia: MacKenzie, 679.
- Skonun formation, Tertiary, British Columbia: MacKenzie, 679.

- Skrainka terrane, pre-Cambrian, Missouri:** Keyes, 565.
- Sloans Valley formation, Mississippian, Illinois:** Brokaw, 111.
- Smithwick shale, Pennsylvanian, Texas:** Udden *et al.*, 1107.
- Sneeds limestone lentil, Ordovician, Arkansas:** Purdue and Miser, 879.
- Snoqualmie granodiorite, Miocene, Washington:** Weaver, 1176.
- Snoqualmie granodiorite, Tertiary, Washington:** Smith, 1022.
- Snyder terrane, Devonian, Missouri:** Keyes, 565.
- Solitario terrane, pre-Cambrian, New Mexico:** Keyes, 565.
- Sonora terrane, Carboniferous, Missouri:** Keyes, 565.
- Southgate member, Ordovician, Ohio:** Braun, 107.
- Sparta shale, Cambrian, Wisconsin:** Ship-ton, 994.
- Spence Bridge volcanic group, Jura-Cretaceous, British Columbia:** Drysdale, 316.
- Spergen limestone, Mississippian, Kentucky:** Butts, 150.
- Spokane formation, pre-Cambrian, Montana:** Haynes, 440.
- Spokane shale, Algonkian, Montana:** Walcott, 1146.
- Springfield dolomite, Silurian, Ohio:** Prosser, 870.
- Stockton limestone, Carboniferous, West Virginia:** Krebs and Teets, 602.
- Stockton member of Newark series, Triassic, Pennsylvania:** Morningstar, 780.
- Stones River limestone, Ordovician, West Virginia:** Grimsley, 416.
- Strawn formation, Pennsylvanian, Texas:** Udden *et al.*, 1107.
- Stump sandstone, Jurassic, Idaho:** Mansfield and Roundy, 698.
- Sucarnoochee clay, Tertiary, Gulf States:** Berry, 63.
- Sundance formation, Jurassic, Wyoming:** Darton, 259; Ziegler, 1275.
- Supai formation, Pennsylvanian, Arizona:** Ransome, 881.
- Superior period, pre-Cambrian, Missouri:** Keyes, 565.
- Sutter formation, Eocene, California:** Dickerson, 294.
- Swauk sandstone, Tertiary, Washington:** Smith, 1022.
- Sylamore sandstone member, Devonian, Tar Spring sandstone, Mississippian, Illinois and Kentucky:** Weller, 1185.
- "Tar Spring" sandstone, Mississippian, Kentucky:** Butts, 150.
- Taylor formation, Cretaceous, Texas:** Udden *et al.*, 1107.
- Taylor marl, Cretaceous, Texas:** Matson, 712.
- Tazin series, pre-Cambrian, Northwest Territory, Canada:** Camsell, 165.
- Teapot sandstone member, Cretaceous, Wyoming:** Hares, 424.
- Tecovas formation, Triassic, Texas:** Udden *et al.*, 1107.
- Tecovas terrane, Triassic, Kansas:** Keyes, 565.
- Tecovas terrane, Triassic, New Mexico:** Keyes, 565.
- Tejon formation, Eocene, Washington:** Weaver, 1176.
- Tejon group, Eocene, California:** Dickerson, 294.
- Telleria terrane, Carboniferous, New Mexico:** Keyes, 565.
- Telleria terrane, Carboniferous, New Mexico:** Keyes, 565.
- Temple Butte limestone, Devonian, Arizona:** Ransome, 881.
- Tennessean series, Carboniferous, Missouri:** Keyes, 565.
- Tensleep sandstone, Carboniferous, Wyoming:** Condit, 224.
- Tensleep sandstone, Pennsylvanian, Wyoming:** Hares, 424.
- Terlingua beds, Cretaceous, Texas:** Udden *et al.*, 1107.
- Tesnus formation, Pennsylvanian, Texas:** Udden *et al.*, 1107.
- Texhoman series, Tertiary, Kansas:** Keyes, 565.
- Thaynes group, Triassic, Idaho:** Mansfield, 693.
- Thaynes limestone, Triassic, Wyoming:** Mansfield, 694.
- Thebes terrane, Ordovician, Missouri:** Keyes, 565.
- Theresa beds, Cambrian, New York:** Miller, 766.
- Thermopolis shale, Cretaceous, Wyoming:** Lupton, 659; Ziegler, 1275.
- Thessalon greenstone, pre-Cambrian Ontario:** Knight, 585.
- Theta subdivision, Jurassic, Texas:** Udden *et al.*, 1107.
- Three Forks formation, Devonian, Mon-**

- Tomstown limestone, Cambrian, West Virginia: Grimsley, 416.
- Torchlight sandstone member, Cretaceous, Wyoming: Lupton, 659.
- Tornado limestone, Carboniferous, Arizona: Ransome, 881.
- Tornillo clays, Cretaceous, Texas: Udden *et al.*, 1107.
- Torrance terrane, Carboniferous, New Mexico: Keyes, 565.
- Torrejon formation, New Mexico: Bauer, 52.
- Torrejon terrane, Tertiary, New Mexico: Keyes, 565.
- Trabuco formation, Cretaceous, California: Packard, 826.
- Travester terrane, Jurassic, Kansas: Keyes, 565.
- Travester terrane, Jurassic, New Mexico: Keyes, 565.
- Travis Peak formation, Cretaceous, Texas: Udden *et al.*, 1107.
- Travis Peak sand, Cretaceous, Texas: Matson, 712.
- Trenton formation, Ordovician, Quebec: Dresser, 313.
- Trenton group, Ordovician, Ontario: Kindle, 577.
- Trenton limestone, Ordovician, New York: Miller, 766.
- Tribune limestone, Mississippian, Kentucky: Ulrich, 1112.
- Trinity division, Cretaceous, Texas: Udden *et al.*, 1107.
- Trinity group, Cretaceous, Texas: Matson, 712.
- Trinity sand, Cretaceous, Louisiana: Matson, 711.
- Troy quartzite, Cambrian(?), Arizona: Ransome, 881.
- Troy sandstone, Cambrian, Arizona: Ransome, 881.
- Truchas terrane, pre-Cambrian, New Mexico: Keyes, 565.
- Trujillo beds, Triassic, Texas: Udden *et al.*, 1107.
- Trujillo terrane, Triassic, Kansas: Keyes, 565.
- Trujillo terrane, Triassic, New Mexico: Keyes, 565.
- Tule beds, Pleistocene, Texas: Udden *et al.*, 1107.
- Tule Spring limestone, Carboniferous, Arizona: Ransome, 881.
- Tusahoma formation, Tertiary, Gulf States: Berry, 63.
- Tuscarora quartzites, Silurian, Pennsylvania: Schubert, 961.
- Twin Creek limestone, Jurassic, Wyoming: Mansfield, 694.
- Twin Creek sandstone, Jurassic, Idaho: Mansfield, 693.
- Two Medicine formation, Cretaceous, Montana: Stebinger, 1041, 1042.
- Tye granite, Jurassic, Washington: Smith, 1022.
- Tygee sandstone, Cretaceous(?), Idaho: Mansfield and Roundy, 698.
- Uffington shale, Pennsylvanian, West Virginia: Reger, 892.
- Unicol formation, Cambrian, Tennessee: Jenkins, 514.
- Unlontown limestone, Pennsylvanian, West Virginia: Reger, 892.
- Unlontown sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Upson clays, Cretaceous, Texas: Udden *et al.*, 1107.
- Utica formation, Ordovician, Quebec: Dresser, 313.
- Utica shale, Ordovician, Ohio: Fenneman, 352.
- Utica shales, Ordovician, New York: Foerste, 365.
- Uvalde formation, Pleistocene, Texas: Udden *et al.*, 1107.
- Uvalde formation, Pliocene or Pleistocene, Texas: Deussen and Dole, 289.
- Valencian series, pre-Cambrian, New Mexico: Keyes, 565.
- Vaiverde flags, Cretaceous, Texas: Udden *et al.*, 1107.
- Vancouver granite, Jurassic, British Columbia: MacKenzie, 679.
- Vancouver group, Jurassic, British Columbia: Clapp, 188.
- Van Horn sandstone, Cambrian, Texas: Udden *et al.*, 1107.
- Vaqueros formation, Tertiary, California: English, 344.
- Vermilion Cliff sandstone, Triassic, Utah: Lupton, 660.
- Vicksburg limestone, Cretaceous, Mississippi: Logan, 650.
- Vicksburg limestone, Tertiary, Gulf States: Matson, 714.
- Vicksburg limestone, Tertiary, Mississippi: Hopkins, 483.
- Victoria terrane, Cretaceous, Kansas: Keyes, 565.
- Vidrio formation, Permian, Texas: Udden *et al.*, 1107.
- Vieja series, Cretaceous, Texas: Udden *et al.*, 1107.
- Virgelle sandstone, Cretaceous, Montana: Stebinger, 1041.
- Virgelle sandstone member, Cretaceous, Montana: Stebinger, 1042.
- Virginia slate, Algonkian, Minnesota: Wolff, 1253.
- Vishnu schist, Archean, Arizona: Noble and Hunter, 793.
- Vivian sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Wahkiakum horizon, Miocene, Washington: Weaver, 1176.
- Waldron shale, Silurian, Indiana: Culbertson, 239.
- Walnut clay, Cretaceous, Texas: Matson, 712.
- Walnut clays, Cretaceous, Texas: Udden *et al.*, 1107.

- War Eagle (Lower) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Warsaw limestone, Mississippian, Kentucky: Butts, 150.
- Wasatch formation, New Mexico: Bauer, 52.
- Wasatch formation, Tertiary, Utah: Lupton, 660; Robinson, 913.
- Washington fire clay shale, Pennsylvanian, West Virginia: Reger, 892.
- Washington formation, Permian, Ohio: Condit, 223; Stauffer, 1039.
- Washita division, Cretaceous, Texas: Udden *et al.*, 1107.
- Washita group, Cretaceous, Louisiana: Matson, 711.
- Washita group, Cretaceous, Texas: Matson, 712.
- Washita terrane, Cretaceous, New Mexico: Keyes, 565.
- Watauga shale, Cambrian, Tennessee: Jenkins, 514.
- Watson bed, Silurian, Missouri: Rowley, 926.
- Waubakee beds, Silurian, Wisconsin: Weldman and Schultz, 1181.
- Waverlyan series, Carboniferous, Missouri: Keyes, 565.
- Waverlyan series, Carboniferous, New Mexico: Keyes, 565.
- Wayan formation, Cretaceous, Idaho: Mansfield and Roundy, 698.
- Waynesboro formation, Cambrian, West Virginia: Grimsley, 416.
- Waynesburg sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Waynesville member, Ordovician, Ontario and Quebec: Foerste, 365.
- Waynesville shale, Ordovician, Ohio: Fenneman, 352.
- Webberville beds, Cretaceous, Texas: Udden *et al.*, 1107.
- Weeks formation, Cambrian, Utah: Walcott, 1145.
- Wekwemikongsing beds, Ordovician, Ontario: Foerste, 365.
- Welch sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Wellborn beds, Eocene, Texas: Udden *et al.*, 1107.
- Wells formation, Carboniferous, Wyoming: Mansfield, 694.
- Weno formation, Cretaceous, Texas: Udden *et al.*, 1107.
- Weston sandstone, Pennsylvanian, West Virginia: Reger, 892.
- Weston shale, Pennsylvanian, West Virginia: Reger, 892.
- West Union, Silurian, Ohio: Prosser, 870.
- Weverton sandstone, Cambrian, West Virginia: Grimsley, 416.
- White River formation, Tertiary, Wyoming: Darton, 259.
- White River formation, Tertiary (Oligocene), South Dakota: Winchester *et al.*, 1248.
- Whitewater formation, Ordovician, Ohio: Fenneman, 352.
- Whitewater member, Ordovician, Ontario and Quebec: Foerste, 365.
- Wichita formation, Permian, Texas: Udden *et al.*, 1107.
- Widder beds, Devonian, Ohio: Stauffer, 1040.
- Wilberns formation, Cambrian, Texas: Udden *et al.*, 1107.
- Wilcox formation, Eocene, Georgia: Brantly, 105.
- Wilcox formation, Tertiary, Arkansas: Stephenson and Cridler, 1047.
- Wilcox group, Tertiary, Gulf States: Berry, 63.
- Wilcox stage, Eocene, Texas: Udden *et al.*, 1107.
- Wilcox ("Sabine") formation, Tertiary, Louisiana: Matson, 711.
- Wildcat series, Pliocene, California: Martin, 704.
- Williamson sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Willow Creek beds, Tertiary, Alberta: Stewart, 1051.
- Willow Creek formation, Eocene(?), Montana: Stebbins, 1041.
- Wind River formation, Eocene, Wyoming: Hares, 424.
- Wind River formation, Tertiary, Wyoming: Ziegler, 1275.
- Windsor series, Mississippian, Nova Scotia: Woodman, 1258.
- Windy Point granite, pre-Cambrian, Colorado: Finlay, 357.
- Wingate sandstone, Jurassic, Arizona and New Mexico: Gregory, 405.
- Wingate terrane, Triassic, New Mexico: Keyes, 565.
- Winifrede (Lower) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Winifrede (Upper) sandstone, Carboniferous, West Virginia: Krebs and Teets, 602.
- Winslow formation, Pennsylvanian, Arkansas: Purdue and Miser, 879.
- Wisconsin drift, Quaternary, Minnesota: Sardeson, 937.
- Wise formation, Carboniferous, Virginia: Hinds, 467.
- Wissahickon mica gneiss, pre-Cambrian, Pennsylvania: Bliss and Jonas, 88.
- Wittenberg terrane, Devonian, Missouri: Keyes, 565.

- Woodbine formation, Cretaceous, Texas: Udden *et al.*, 1107.
- Woodbine sand, Cretaceous, Louisiana: Matson, 711.
- Woodbine sand, Cretaceous, Texas: Matson, 712.
- Woodmont shale, Devonian, Maryland, West Virginia: Grimsley, 416.
- Woodside shale, Triassic, Idaho: Mansfield, 693.
- Woodside shale, Triassic, Wyoming: Mansfield, 694.
- Word formation, Permian, Texas: Udden *et al.*, 1107.
- Wreford limestone, Carboniferous, Oklahoma: Heald, 441.
- Yakima basalt, Miocene, Oregon: Collier, 218.
- Yakoun formation, Jurassic, British Columbia: MacKenzie, 879.
- Yegua formation, Eocene, Texas: Udden *et al.*, 1107.
- Yegua formation, Tertiary, Texas: Deussen and Dole, 289.
- Yellville terrane, Ordovician, Missouri: Keyes, 565.
- Yeso terrane, Carboniferous, New Mexico: Keyes, 565.
- Yogo limestone, Cambrian, Montana: Walcott, 1146.
- Ysodro terrane, pre-Cambrian, New Mexico: Keyes, 565.
- Zunian series, Jurassic, New Mexico: Keyes, 565.

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CONTENTS.

	Page
Introduction.....	3
Serials examined.....	5
Bibliography.....	9
Outline of subject headings.....	89
Index.....	93
Lists.....	135
Chemical analyses.....	135
Minerals described.....	136
Rocks described.....	138
Geologic formations described.....	139

BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY FOR 1917, WITH SUBJECT INDEX.

By JOHN M. NICKLES.

INTRODUCTION.

The bibliography of North American geology, including paleontology, petrology, and mineralogy, for the year 1917 follows the plan and arrangement of its immediate predecessors. It includes publications bearing on the geology of the Continent of North America and adjoining islands; also Panama and the Hawaiian Islands. Papers by American writers on the geology of other parts of the world are not included. Textbooks and papers general in character by American authors are included; those by foreign authors are excluded unless they appear in American publications.

As heretofore, the papers, with full title and medium of publication and explanatory note when the title is not fully self-explanatory, are listed under the authors, arranged in alphabetic order. The author list is followed by an index to the literature listed. In this index the entries in one alphabet are of three kinds—first, subject, with various subdivisions, to enable the specialist to ascertain readily all the papers bearing on a particular subject or area; second, titles of papers, many of them abbreviated or inverted, under their leading words; and third, cross references, which have been freely used to avoid too much repetition. The subjects have been printed in black-faced type, the titles of papers and cross references in ordinary type. As it may not be always obvious which subject headings have been adopted, an outline of those used immediately precedes the index

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OUTLINE OF SUBJECT HEADINGS.

In the following index the subject headings are printed in black-faced type. An outline of these is here given that it may be quickly seen which subject heading of two or more synonyms has been adopted. Thus "petroleum" and not "oil" nor "rock oil" has been chosen. That the specialist may see at a glance under what headings to find cognate literature, subject headings that are more or less closely related have been grouped together under the following heads: Areal or regional, general, economic, dynamic and structural, physiographic, stratigraphic or historical, paleontology, petrology, mineralogy, underground water. In the index the specific entries under the areal or regional subject headings are alphabetized under these same heads arranged in the same order, namely, general, economic, etc.

AREAL OR REGIONAL.

The States and Territories of the Union, Alabama, Alaska, etc.; The Provinces of Canada, Alberta, etc.; Greenland; Arctic regions; Mexico; the countries of Central America; the West Indies, and the single islands; the Hawaiian Islands.

GENERAL.

Associations, meetings; Addresses; Philosophy; History; Biography; Bibliography; Education; Textbooks.

Surveys; Fieldwork; Excursions; Technique; Cartography.

Classification; Nomenclature.

Geochemistry; Chemical analyses (list); Geophysics; Atmosphere; Radioactivity.

Experimental investigations; Borings; Miscellaneous.

ECONOMIC.

Ore deposits, origin; Contact phenomena.

Gold; Placers; Black sands; Silver; Quicksilver; Nickel; Cobalt; Copper; Lead; Zinc; Iron; Magnetite; Manganese; Tin.

Aluminum; Bauxite; Antimony; Bismuth; Tungsten; Vanadium; Uranium; Carnotite ores; Molybdenum; Chromic iron ore.

Platinum; Palladium; Titanium; Rutile; Rare earths; Monazite; Zircon.

Coal; Anthracite; Lignite; Peat.

Petroleum; Natural gas; Oil shales; Asphalt; Albertite; Gilsonite; Bitu-

Abrasive materials; Corundum; Emery; Garnet; Diatomaceous earth; Tripoli; Volcanic ash; Pumice; Millstones; Whetstones; Novaculite; Feldspar. Phosphate; Apatite; Potash; Alunite; Nitrate; Glauconite; Marl. Salt; Salines; Bromine; Calcium chloride; Borax; Fluorspar. Barite; Strontium; Mineral paints. Arsenic; Fuller's earth; Infusorial earth; Magnesite; Mica; Graphite. Phosphorus; Sulphur; Pyrite. Soils.

DYNAMIC AND STRUCTURAL.

Earth, Genesis of; Earth, age of; Earth, interior of; Earth, temperature of. Volcanism; Volcanoes; Earthquakes; Seismology; Seismographs; Mud volcanoes.

Isostasy; Orogeny; Changes of level.

Magmas; Magmatic differentiation; Laccoliths; Intrusions; Dikes; Contact phenomena.

Deformation; Folding; Faulting; Unconformities.

Conglomerates; Concretions; Stalactites; Jointing; Cleavage.

Denudation; Erosion; Coast changes; Coral islands and reefs; Weathering; Caves; Sink holes; Wind work; Dunes; Loess; Landslides.

Glaciers; Glacial erosion; Glacial striæ; Potholes; Kettle holes.

Sedimentation; Eskers; Kames; Moraines.

Drainage changes.

PHYSIOGRAPHIC.

Geomorphy; Relief maps.

Plains; Prairies; Penepains; Valleys; Cirques; Deserts; Alluvial fans; Deltas; Mounds, natural; Sink holes; Karsts; Natural bridges.

Rivers; Stream piracy; Meanders; Falls; Lakes; Swamps; Marshes; Everglades.

Terraces; Beaches; Shore lines.

STRATIGRAPHIC OR HISTORICAL.

Geologic history; Geologic time; Paleogeography; Paleogeographic maps; Paleoclimatology.

Geologic maps; Geologic formations described (list); Tables of formations; Unconformities; Borings.

Pre-Cambrian; Paleozoic (undifferentiated); Cambrian; Ordovician; Silurian; Devonian; Carboniferous; Mesozoic (undifferentiated); Triassic; Jurassic; Cretaceous; Tertiary; Quaternary; Recent.

Glacial geology; Glaciation; Drift deposits; Glacial lakes; Erratic boulders; Ice ages (ancient).

PALEONTOLOGY.

Geomorphic distribution; Evolution; Distribution

Protozoa; Spongida; Foraminifera.

Paleobotany; Diatoms; Algæ.

Problematica.

PETROLOGY.

Rocks, origin; **Rocks**, structural features; **Rocks** described (list); **Igneous and volcanic rocks**; **Rock-forming minerals**; **Lava**; **Oolite**; **Dolomite**; **Pebbles**.

MINERALOGY.

Minerals described (list); **Crystallography**; **Pseudomorphism**; **Paragenesis of minerals**; **Rock-forming minerals**; **Meteorites**.

UNDERGROUND WATER.

Mineral waters; **Thermal waters**; **Geysers**; **Springs**; **Mine waters**.

INDEX.

(The numbers refer to entries in the bibliography.)

Abrasives.

General : Katz, 544.

Addresses.

Fossil insects : Cockerell, 210.
Future for geologists : Hubbard, 498.
Geological work in the Southwest :
Gould, 390.
Geology and public service : Smith, 960.
Philosophy of geology and the order of
the state : Clarke, 208.
State geologist and conservation : Pur-
due, 826.

Adirondack Mountains : Miller, 784.

Alabama.

Economic.

Mineral production, 1915 : Smith, 955.
Oil and gas possibilities : Smith, 956.
Petroleum : Fuller, 360.

Dynamic and structural.

Earthquake, October 18, 1916 : Finch,
345 ; Hopkins, 484.
Structural features : Smith, 956.

Stratigraphic.

Hatchetigbee anticline : Hopkins, 488.
Tuscaloosa formation, delta character :
Berry, 67.

Mineralogy.

Halloysite : Vander Meulen, 1059.

Alaska.

Economic.

Anvik-Andreafski region : Harrington,
425.

Copper, Latouche and Knight Island
districts, Prince William Sound :
Johnson, 529.

Copper River basin : Moffit, 739.

Fairbanks district : Mertie, 721.

Gold, Juneau belt : Eakin, 310.

Porcupine district : Eakin, 311.

Seward Peninsula : Mertie, 723.

Tickel district : Moffit, 739.

Gold placers, Anvik-Andreafski region :
Harrington, 425.

Nenana region : Maddren, 682.

Tolovana district : Mertie, 720.

Iron : Whittier, 1137.

Kantishna region : Capps, 174.

Ketchikan district : Chapin, 190.

Mineral production, 1916 : Brooks, 124.

Mining industry, 1915 : Smith, 968.

Nenana region : Overbeck, 772.

Prince William Sound, copper and
gold : Johnson, 528.

Seward Peninsula : Mertie, 722.

Wrangell district : Chapin, 190.

Alaska—Continued.

Physiographic.

Physiographic provinces : Brooks, 122.

Stratigraphic.

Anvik-Andreafski region : Harrington,
425.

Nenana region : Overbeck, 772.

Quaternary history, central Alaska :
Eakin, 309.

Tolovana district : Mertie, 720.

Paleontology.

Fruit or nut, supposed, Tertiary :
Thomas, 1022.

Mineralogy.

Chalmersite, Prince William Sound :
Johnson, 530.

Underground water.

Mineral springs : Waring, 1096.

Alberta.

Economic.

Bituminous sands, northern Alberta :
Ells, 318, 319.

Building and ornamental stones :
Parks, 783.

Coal : Dowling, 297.

Crowsnest field : Rose, 880.

Drumheller area : Dowling, 297.

Foothills north of Grand Trunk Pa-
cific railway : MacVicar, 681.

southern Alberta : Dowling, 296.

west central Alberta : Stewart, 993.

Gypsum, northern Alberta : Camsell,
167.

Natural gas : Slipper, 954.

Oil, gas, and water : Dowling, 297.

Petroleum : Slipper, 954.

Phosphate : Adams, 1 ; Adams and
Dick, 6.

Banff area : De Schmid, 273.

Salt, northern Alberta : Camsell, 167.

Tar sands, Athabasca River : McLearn,
676.

Physiographic.

Southern plains : Dowling, 296.

Stratigraphic.

Athabasca River section : McLearn,
676.

Banff area : De Schmid, 273.

Borings : Slipper, 954.

west central Alberta : Stewart, 993.

Cambrian : Walcott, 1078.

Crowsnest coal field : Rose, 880.

Foothills north of Grand Trunk Pacific
railway : MacVicar, 681.

Northern Alberta : Camsell, 167.

Phosphate region : Adams and Dick, 6.

Alberta—Continued.**Stratigraphic—Continued.**

Rocky Mountains, geologic history :
Allan, 11.

Southern plains: Dowling, 296.

Paleontology.

Cheneosaurus tolmansensis, Edmonton
Cretaceous: Lambe, 603.

Edmontosaurus regalis, Edmonton
formation: Lambe, 604.

Gorgosaurus, Cretaceous: Lambe, 601.

Mount Whyte fauna: Walcott, 1080.

Southern plains: Dowling, 296.

Allanite, weathering of: Watson, 1105.

Algonkian. *See* Pre-Cambrian.

Aluminum hydrates: Wysor, 1182.

Aluminum.

General: Hill, 464.

American Association of State Geologists,
field trip in Oklahoma: Hotchkiss, 496.

Ammonites. *See* Cephalopoda.

Amphibia.

Calamops, Triassic, Pennsylvania: Sinclair, 949.

California, Rancho La Brea, Bufo:
Camp, 162.

Coal measures: Gregory, 405.

Eryopsoides, Permian, New Mexico:
Douthitt, 294.

Labyrinthodont, Newark series: Sinclair, 948.

Linton fauna, environment: Case, 178.

Nebraska, Tertiary: Cook, 230.

Analyses, chemical. *See* list, p. 135.

Animakie. *See* Pre-Cambrian.

Anorthosite body in Adirondacks: Cushing,
246.

Anthozoa (corals).

California, Carrizo Creek: Vaughan,
1064.

Cyathophyllum, Niagara, Jones County,
Iowa: Thomas, 1021.

Diphyphylloid corals: Chadwick, 185.

Ellesmere Land, Devonian corals:
Loewe, 645.

Pacific coast: Nomland, 760.

Tertiary, history: Vaughan, 1064.

Tetracoralla, relationship to Hexacoralla: Robinson, 870.

Antimony.

General: Hess, 456.

Alaska, Fairbanks district: Mertie,
721.

Kantishna region: Capps, 174.

Seward Peninsula: Mertie, 722.

Arkansas: Shriver, 940.

Mexico, Fresnillo: Amador, 17.

Aphroloth and dermoloth: Jaggard, 517.

Appalachian oil field: Fuller, 380.

Appalachian oil field brines: Richardson,
858.

Appalachian oil fields, dry sands: Reeves,
843.

Appalachian oil fields, dryness of certain
sands: Shaw, 933.

Arctic regions.

General: O'Neill, 765.

Economic.

Copper: O'Neill, 766.

Stratigraphic.

General: O'Neill, 765.

Ellesmere Land, Devonian: Kiser, 577.

Paleontology.

Ellesmere Land, Devonian: Kiser, 577.

Loewe, 645.

Devonian fishes: Kiser, 577.

König Oscar and Helberg Land, Carboniferous: Tschernyschew and
Stepanow, 1086.

Arizona.**General.**

Phoenix region: Vacher, 1057a.

Economic.

Detrital copper deposits: Tovote, 1028.

Gems: Cullin, 242.

Lime rocks: Cullin, 241.

Mineral production, 1916: Helkes, 446.

Miscellaneous minerals: Joseph, 541.

Mohave County: Schrader, 909.

Molybdenum, Hualpai Mountains:
Wickes, 1188.

Navajo country: Gregory, 402.

Patagonia district: Schrader, 908.

Santa Rita district: Schrader, 908.

Warren district, Bisbee: Bonillas *et al.*,
92.

Dynamic and structural.

Grand Canyon: Darton, 260.

Physiographic.

Grand Canyon: Darton, 260; Drygalski,
301a.

Navajo country: Gregory, 402.

Stratigraphic.

Grand Canyon: Darton, 260.

Mohave County: Schrader, 909.

Navajo country: Gregory, 402.

Patagonia district: Schrader, 908.

San Simon Valley: Schwennesen, 913.

Santa Rita district: Schrader, 908.

Warren district, Bisbee: Bonillas *et al.*,
92.

Mineralogy.

Meteorites, Canyon Diablo, structure:
Meunier, 725.

Warren district, Bisbee: Bonillas *et al.*,
92.

Underground water.

San Simon Valley: Schwennesen, 913.

Arkansas.**Economic.**

Antimony: Shriver, 940.

Manganese, Caddo Gap and De Queen
quadrangles: Miser, 737.

Stratigraphic.

Bingen sand: Berry, 69.

Caddo Gap and De Queen quadrangles:
Miser, 737.

Pottsville formations: Mather, 689.

Paleontology.

Plants, Bingen sand: Berry, 69.

Arsenic.

General: Hess, 456.

Artesian waters and wells. *See* Under-ground water.

Asbestos.

General: Diller, 288.

Origin of chrysotile veins: Taber, 1012.

Quebec, Black Lake-Thetford area: Graham, 395.

Thetford-Black Lake district (Cole-raine sheet): Knox, 596.

Asphalt. *See also* Grahamite.

General: Northrup, 761.

Origin: Richardson, 855, 857.

United States: Shaw, 930.

Associations, meetings.

Geological Society of America, Albany meeting, December, 1916: Ber-key, 63.

Paleontological Society, eighth meet-ing, December, 1916: Bassler, 48.

Paleontological Society, Pacific coast section, seventh meeting: Stock, 994.

Aves* (birds).

Colorado, Florissant: Shufeldt, 943.

Diatryma, Wyoming: Matthew, 704; Matthew and Granger, 705, 706.

Florida, Vero: Shufeldt, 941, 942.

Palaeochenoides mioceanus: Wetmore, 1112.

Barite.

General: Hill, 467.

Missouri: Tarr, 1014.

Barytes. *See* Barite.

Bathyliths. *See* Intrusions.

Batrachia. *See* Amphibia.

Bauxite.

General: Hill, 464.

Aluminum hydrates: Wysor, 1182.

Georgia, Coastal Plain: Shearer, 936.

United States: Hill, 464.

Beaches. *See also* Shore lines; Terraces.

Michigan, Detroit district: Sherzer, 937.

Nevada, Big Smoky Valley: Meinzner, 709.

Belemnitella americana and *mucronata*, habitat: Dorsey, 293.

Bentonite.

Wyoming, Bighorn basin: Hewett, 459.

Beryl, etching figures: Honess, 476.

Bibliography—Continued.

Hilgard, E. W., writings: Smith, 957.

Hill, F. A., writings: Halberstadt, 415.

New York, Long Island: Fairchild, 350.

Nickel: Royal Ontario Nickel Commis-sion, 882.

Phosphate, United States: Mansfield, 685.

Prosser, C. S., writings: Cumings, 248.

Safford, J. M., writings: McGill, 672.

South Dakota, Black Hills region: O'Harra, 763.

Biography.

Bell, Robert: Adams, 2, 3.

Clark, W. B.: Berry, 76; Anon., 1193.

Davis, C. A.: Lane, 606.

Drysdale, C. W.: Jacobs, 511.

Hague, Arnold: Diller, 286.

Hayes, C. W.: Brooks, 123.

Hilgard, E. W.: Smith, 957.

Hill, F. A.: Halberstadt, 415.

Osborn, H. F.: Woodward, 1171.

Prosser, C. S.: Cumings, 248.

Safford, J. M.: McGill, 672.

Birds. *See* Aves.

Bismuth.

General: Hess, 456.

Bituminous shale.

Eastern United States: Ashley, 26.

Bituminous rock.

General: Northrop, 761.

Bivalves. *See* Pelecypoda.

Blastoidea.

Montana, southwestern, Carboniferous:

Clark, 201.

Steganoblastus, external structure:

Hudson, 499.

Bonanza district, Saguache County, Colo-rado: Patton, 787.

Borings.

Alberta: Slipper, 954.

west central: Stewart, 993.

Illinois, Plymouth oil field: Blatchley, 86.

Kansas: Taylor, 1016.

Leavenworth: Hinds and Greene, 471.

Louisiana, Belle Isle: Lucas, 655.

National bureau of well-log statistics, need of: Matteson, 700.

Ohio, Cleveland gas field: Rogers, 875. southern: Stout, 1008.

Oklahoma: Shannon *et al.*, 924.

Bristow quadrangle: Fath, 333.

Brachiopoda.

- Greenland, Carboniferous: Grönwall, 407.
 Montana, southwestern, Carboniferous: Clark, 201.
 Platystrophia, morphological variations: McEwan, 671.
 Polkilosakos, Carboniferous, Young County, Texas: Watson, 1102.
 Rensselaerina, Linden shale, Tennessee: Dunbar, 307.
 Richthofenia, Texas, Permian: Böse, 91.

Breccias.

- Classification: Norton, 762.
 Mariposa formation, Colfax, California: Moody, 742.

Brines.

- Diffusion in Appalachian oil-field waters: Richardson, 859.
 Oil fields, origin of brines: Reeves, 842.

British Columbia.*Economic.*

- General: Robertson, 866.
 Bridge River district: Drysdale, 303.
 Building and ornamental stones: Parks, 782.
 Coal, Elk Valley basin: Rose, 879.
 Copper-gold-silver deposits, Vancouver and adjacent islands: Brewer, 117.
 Graphite, Cranbrook: De Schmid, 273.
 Hedley district, Nickel Plate mine: Rickard, 861.
 Iron: Whittier, 1137.
 Vancouver and Texada islands: Brewer, 116.
 Kootenay terranes: Drysdale, 303.
 Magnesite, Bridge River district: Drysdale, 303.
 Molybdenite, Lillooet mining division: Drysdale, 303.
 Phoenix, Osoyoos district: Rickard, 862.
 Rossland district: Bruce, 132, 133.
 Silver-lead ores, Slovan district: Uglow, 1051.
 Slovan district: Drysdale, 303; Uglow, 1051.
 Sooke and Duncan areas, Vancouver Island: Clapp, 193.
 Ymir area, West Kootenay district:

British Columbia—Continued.*Stratigraphic—Continued.*

- Ross Lake section: Walcott, 1079.
 Rossland district: Bruce, 132, 133.
 Sicker series, Vancouver Island: Cooke, 233.
 Slovan district: Uglow, 1051.
 Sooke and Duncan areas, Vancouver Island: Clapp, 193.
 Telkwa River district: Dolmage, 292.
 Ymir area, West Kootenay district: Drysdale, 302.

Paleontology.

- Albertella fauna: Walcott, 1079.
 Bridge River district: Drysdale, 303.
 Mount Whyte fauna: Walcott, 1080.

Petrology.

- Rossland district: Bruce, 132, 133.
 Sicker series, Vancouver Island: Cooke, 233.
 Sooke and Duncan areas, Vancouver Island: Clapp, 193.
 Ymir area, West Kootenay district: Drysdale, 302.

Mineralogy.

- Aphrosiderite: Larsen and Steiger, 618.
 Augite, titaniferous, Ice River: Warren and Allan, 1098.
 Rossland district: Bruce, 132, 133.
 Spencerite, crystal form: Walker, 1082.

Bromine.

- General: Stone, 1002.

Bryozoa.

- Tertiary, Chelostomata: Canu and Bassler, 172.
 classification: Canu and Bassler, 173.

Building stone. See also Granite; Lime stone; Sandstone; Stone.

- General: Richardson, 854.
 Alberta: Parks, 783.
 Manitoba: Parks, 783.
 Mexico: Tello, 1019.
 Naucalpan y Huixquilucan: Mexico, 724.

- Saskatchewan: Parks, 783.

Bull Mountain coal field, Mussellshell and Yellowstone counties, Montana:

Woolsey *et al.*, 1173.

Burning of coal beds: Rogers, 874.**Cadmium.**

California—Continued.

Economic.

- Alpine County: Eakle, 312.
 Butte County: Waring, 1089.
 Chromite, Shasta County: Diller, 287.
 Chromium: Boalich, 90.
 El Dorado County: Tucker, 1038.
 Inyo County: Waring and Huguenin, 1095.
 Iron: Whittier, 1137.
 Lassen County: Tucker, 1040.
 Leona rhyolite: Clark, 197.
 Lithium minerals: Schaller, 902.
 Los Angeles County, mineral resources: Merrill, 716.
 Manganese: Boalich, 90.
 Mineral production, 1916: Bradley, 106; Yale, 1183.
 Modoc County: Tucker, 1041.
 Mono County: Eakle and McLaughlin, 314.
 Monterey County: Waring and Bradley, 1094.
 Orange County, mineral resources: Merrill, 716.
 Ore deposition and enrichment at Engels: Graton and McLaughlin, 397; Tolman, 1024.
 Petroleum, gravity variation due to sulphur: Rogers, 876.
 McKittrick district: Gester, 372.
 Petroleum fields: Pack, 774.
 Placer County: Waring, 1091.
 Pyrite, Leona rhyolite: Clark, 197.
 Riverside County, mineral resources: Merrill, 716.
 Sacramento County: Waring, 1092.
 San Benito County: Bradley and Logan, 107.
 San Bernardino County: Cloudman et al., 209.
 San Luis Obispo County: Logan, 646.
 Santa Barbara County: Huguenin, 501.
 Sutter County: Waring, 1090.
 Tehama County: Tucker, 1042.
 Tulare County: Tucker, 1039.
 Tungsten, Inyo County: Knopf, 592.
 Ventura County: Huguenin, 502.
 Yuba County: Waring, 1093.

Dynamic and structural.

- Earthquakes, 1916: Palmer, 777.
 registration, April 1–September 30, 1916: Davis, 261.
 registration, 1916–17: Davis, 262.
 southern and eastern California: Hamlin, 417.
 Lassen Peak lava, viscous nature: Diller, 285.
 Santa Barbara Channel earthquakes: Mattel, 698.
 Tejon Pass earthquake, 1916: Branner, 110.

Physiographic.

- Salton Sea: Macdougall, 669.
 Sierra Nevada: Gilbert, 376; Machatschek, 672a.
 Yosemite: Williams, 1144.

California—Continued.

Stratigraphic.

- Alpine County: Eakle, 312.
 Andalusite mass, Inyo Range: Knopf, 593.
 Astoria series, Mount Diablo region: Clarke, 204.
 Carrizo Valley, Imperial County: Vaughan, 1064.
 Etchegoin Pliocene, Coalinga region: Nomland, 757.
 Geologic formations: Smith, 962.
 Glaciation, Sierra Nevada: Muir, 745.
 Inyo County: Waring and Huguenin, 1095.
 Leona rhyolite: Clark, 1917.
 McKittrick district: Gester, 372.
 Mariposa formation: Moody, 742.
 Martinez Eocene time, climatic zones: Dickerson, 280.
 Martinez formation: Waring, 1088.
 Marysville Buttes: Dickerson, 282.
 Mohave Desert: Clark, 196.
 Mono County: Eakle and McLaughlin, 314.
 Monterey quadrangle: Hawley, 431.
 Moraines, post-Pleistocene, Sierra Nevada: Matthes, 701.
 Morro Hill, southern California: Waring and Waring, 1097.
 Pliocene: Nomland, 758.
 Sallinas quadrangle: Hawley, 431.
 San Benito County: Bradley and Logan, 107.
 Santa Margarita beds, North Coalinga region: Nomland, 759.

Paleontology.

- Carrizo Creek coral fauna: Vaughan, 1064.
 Crab, Pliocene: Rathbun, 832.
 Echinoids, Tertiary: Kew, 561.
 Etchegoin Pliocene, Coalinga region: Nomland, 757.
 Felidae, Rancho La Brea: Merriam, 712.
 Fernando fauna, Los Angeles: Moody, 741.
 Martinez fauna: Waring, 1088.
 Mylodon, Rancho La Brea: Stock, 999.
 Nothotherium, Rancho La Brea: Stock, 997, 998.
 Pinole tuff fauna: Merriam, 715.
 Pliocene faunas: Merriam, 713; Nomland, 758.
 Rancho La Brea, Bufo: Camp, 162.
 Mylodon: Stock, 996.
 Santa Margarita beds, North Coalinga region: Nomland, 759.

Petrology.

- Andalusite mass, Inyo Range: Knopf, 593.
 Crestmore, Riverside County: Eakle, 313.
 Leona rhyolite: Clark, 197.
 Morro Hill lavas: Waring and Waring, 1097.

California—Continued.*Mineralogy.*

Crestmore, Riverside County: Eakle, 813.

Durdenite, Calaveras County: Larsen, 614.

Eakleite, St. Inez: Larsen, 616.

Griifithite: Larsen and Steiger, 618.

Labradorite, aventurine, Modoc County: Andersen, 18.

Massicot, San Bernardino County: Larsen, 611.

Underground water.

Morgan Hill area: Clark, 202.

Oil-field waters, San Joaquin Valley: Rogers, 877.

Cambrian.*Stratigraphy.*

Arizona, Warren district: Bonillas *et al.*, 92.

Arkansas, Caddo Gap and De Queen quadrangles: Miser, 737.

British Columbia, Ross Lake section: Walcott, 1079.

Ymir area, West Kootenay district: Drysdale, 302.

California: Smith, 962.

Colorado, Gold Brick district: Crawford and Worcester, 238.

Cordilleran formations: Walcott, 1078.

Idaho, Mackay region: Umpleby, 1054.

Maryland, Tolchester quadrangle: Miller *et al.*, 730.

Massachusetts: Emerson, 321.

Missouri, Ozark region: Buehler, 137.

Montana, Garrison-Phillipsburg fields: Pardee, 780.

Gordon Mountain section: Walcott, 1079.

Mount Whyte formation: Walcott, 1077.

New Mexico, Deming quadrangle: Darton, 257.

southern: Darton, 258.

New York, Adirondack Mountains: Miller, 734.

Edwards district: Newland, 753.

Ogdensburg region: Cushing, 245.

Pennsylvania, Cumberland-Lebanon Valley: Stose, 1007.

Lehigh County: Miller, 728.

Rocky Mountain region: Tomlinson, 1027.

Vermont, Calais, East Montpelier, and Berlin: Richardson, 853.

western: Perkins, 794.

Canada—Continued.*General—Continued.*

Mineral springs, radioactivity: Satterly and Elworthy, 891.

Mines Branch, report 1916: Haanel, 411.

National parks: Camsell, 186.

Survey report for 1916: McInness, 673.

Economic.

Coal, eastern Canada: Gray, 398.

Iron ore occurrences: Lindeman, 639; Robinson, 867.

Magnetite: Frechette, 357.

Mineral production, 1915: McLeish, 677.

Petroleum: Miller, 731.

Sands and sandstones: Cole, 216.

Dynamic and structural.

Glaciers, Rockies and Selkirks: Coleman, 218.

Weathering phenomena: Andrée, 19.

Stratigraphic.

General: Mather, 691.

Paleontology.

General: Mather, 691.

Invertebrate paleontologist, report: Kindle, 578.

Paleobotany, report on: Wilson, 1156.

Vertebrate paleontologist, report: Lambe, 602.

Mineralogy.

Mineralogy, report on: Johnston, 533.

Canal Zone. See Panama.**Carboniferous.***Stratigraphic.*

Alaska, Tolovana district: Mertle, 720.

Alberta: Adams and Dick, 6.

Amaden formation, Wyoming: Branson and Greger, 114.

Arizona, Navajo country: Gregory, 402.

Warren district: Bonillas *et al.*, 92.

Arkansas, Caddo Gap and De Queen quadrangles: Miser, 737.

Pottsville formations: Mather, 689.

British Columbia, Rossland district: Bruce, 132.

Burlington limestone: Tarr, 1015.

California: Smith, 962.

Colfax region: Moody, 742.

Colorado, Gold Brick district: Crawford and Worcester, 238.

northern: Ziegler, 1187.

Conemaugh series: (White), Case, 176.

Granite boulders associated with

Carboniferous—Continued.

Stratigraphic—Continued.

Chicago, etc.—Continued.

Colchester-Macomb quadrangles:
Hinds, 469, 470.

Jackson County: Cady, 151.

Massac County: Shaw, 984.

southern: Brokaw, 121; St. Clair,
886.

Kansas, Leavenworth quadrangle:
Hinds and Greene, 471.

Kansas, Silver City area: Twenhofel,
1044.

Kentucky, Irvine field: Shaw, 982.

Maine, southwestern: Katz, 546.

Massachusetts: Emerson, 321.

Michigan, Detroit district: Sherzer,
937.

Montana, Bowdoin dome: Collier, 223.

Missouri, Leavenworth quadrangle:
Hinds and Greene, 471.

Smithville quadrangle: Hinds and
Greene, 471.

Nevada, Ely district: Spencer, 975.

New Hampshire, southeastern: Katz,
546.

New Mexico, Deming quadrangle: Dar-
ton, 257.

Pecos Valley, Permian: Wrather,
1174.

southern: Darton, 258.

Ohio: Bownocker, 104.

southern: Stout, 1008.

Oklahoma, Pennsylvanian: Bloesch, 88.
Pottsville formations: Mather, 689.

southern: Powers, 816.

Pennsylvanian-Permian stratigraphic
break: Lee, 624.

Red beds: Case, 177.

age and origin, southeastern Wyom-
ing: Knight, 589.

Rhode Island: Emerson, 321.

Tennessee, Waynesboro quadrangle:
Miser, 738.

western: Dunbar, 306.

Texas, Permian: Wrather, 1174.

Rustler Springs region: Porch, 811.

West Virginia, Braxton and Clay
counties: Hennen, 451.

Braxton and Clay counties: Price,
820.

Uffington shale: Price, 821, 822.

Wyoming, Big Horn Basin: Hewett,
461.

Paleontology.

Arctic regions, König Oscar and Hel-
berg Land: Tschernyschew and
Stepanow, 1036.

Greenland, northeastern, Brachiopoda:
Grönwall, 407.

Illinois, Mazon Creek: Cockerell, 214.

Indiana, Pennsylvanian Plantæ: Jack-
son, 510.

Linton fauna, environment: Case, 178.

Missouri, Phelps County, Mississip-
pian: Bridge, 118.

Carboniferous—Continued.

Paleontology—Continued.

Montana, southwestern, Blastoides and
Brachiopoda: Clark, 201.

Oklahoma, Pawhuska, footprints: Jill-
son, 523.

Texas, Richthofenia, Permian: Böse,
91.

Young County, Poikilosakos: Watson,
1102.

West Virginia, Braxton and Clay coun-
ties: Price, 820.

Cartography. *See* Maps.

Caves.

Indiana, Versailles: Bigney, 79.

Mammoth Cave, Kentucky: Nelson,
750.

Central America. *See also* Costa Rica:
Guatemala, etc.

General.

Panama straits, ancient: Dickerson,
281.

Stratigraphic.

General: Dickerson, 281.

Cephalopoda. *See also* Mollusca.

Ammonites, Mesabi range, Minnesota:
Wolff, 1166.

Belemnites americana and mucron-
ata, habitat: Dorsey, 293.

Cerium.

General: Schaller, 905.

Chalmersite, Prince William Sound, Alaska:
Johnson, 580.

Cetacea. *See* Mammalia.

Changes of level. *See also* Beaches; Shore
lines; Terraces.

Atlantic coast stability: Johnson, 581.

New York, Long Island: Fairchild, 380.

Vermont: Fairchild, 327.

Postglacial: Fairchild, 327.

Chemical analyses. *See* list, p. 135.

Cheneosaurus tolmansensis, Edmonton Cre-
taceous: Lambe, 603.

Chert in Burlington limestone, origin: Tarr,
1015.

Chromic-iron deposits, nature and occur-
rence: Dolbear, 291.

Chromite.

General: Diller, 287.

Chromic-iron deposits, nature and oc-
currence: Dolbear, 291.

California: Diller, 287.

Quebec: Dresser, 300.

Thetford—Black Lake district (Cole-
rairie sheet): Knox, 596.

Chromium.

General: Ries, 864.

California: Boalich, 90.

Classification.

Breccias: Norton, 762.

Igneous rocks: Johannsen, 526.

Metamorphic rocks: Miller, 735.

Metamorphism: Daly, 233.

Minerals, native element: Wherry,
1120.

Classification—Continued.

Ore deposits: Quirke, 828.

Boulder batholith, Montana: Billingsley and Grimes, 80.

Petroleum and natural gas fields: Clapp, 195.

Reptilia: Williston, 1148.

Underground volatile agents: Daly, 252.

Clay. See also Fire clay.

General: Richardson, 854.

Origin, Piedmont clays: Ries and Somers, 865.

California, Temescal, Riverside County: Merrill, 716.

Illinois, Union County, Mountain Glen: St. Clair, 889.

Louisiana: Matson, 695.

South Dakota, Pierre formation, clay derived from volcanic dust: Wherry, 1121.

Texas, dolomitic: Ries, 863.

Virginia, Piedmont province: Ries and Somers, 865.

Climate, geologic. See Paleoclimatology.

Climate, influence on ore formation: Aubouin, 31.

Climatic pulsations, lithologic evidence: Vail, 1058.

Coal. See also Anthracite; Lignite.

General: Gilbert, 375; Stevenson, 991.

Classification: Campbell, 165.

Coal beds, burning: Rogers, 874.

Cost: Smith and Leshner, 961.

Formkohle, origin: Stevenson, 992.

Interrelations of fossil fuels: Stevenson, 991.

Origin and formation: Jeffrey, 521.

Parallelism of eastern and western interior fields: Keyes, 576.

Water content: Mack and Hulett, 674.

Alberta, Crowsnest field: Rose, 880.

Drumheller area: Dowling, 297.

foothills north of Grand Trunk Pacific railway: MacVicar, 681.

southern: Dowling, 296.

west central: Stewart, 993.

British Columbia, Elk Valley: Rose, 879.

Canada, eastern: Gray, 398.

Colorado, Yampa field: Whiteside, 1135.

Illinois: Young, 1185.

Colchester and Macomb quadrangles:

Coal—Continued.

Missouri—Continued.

Smithville quadrangle: Hinds and Greene, 471.

Montana, Bull Mountain coal field: Woolsey *et al*, 1173.

Nebraska: Barbour, 38.

New Brunswick: Brown, 128; Gray, 398.

Nova Scotia: Brown, 128; Gray, 398.

Ohio: Bownocker, 104.

southern: Stout 1008.

tonnage: Clark, 198.

Tennessee, Pikeville quadrangle: Butts, 149.

United States: Campbell, 164, 165; Stevenson, 991.

Western coal deposits: Kirk, 583.

West Virginia, Braxton and Clay counties: Hennen, 451.

Coal measures. See Carboniferous.

Coastal salt domes: Kennedy, 560.

Cobalt.

General: Hess, 455.

Colorado.**Economic.**

Bonanza district, Saguache County: Patton, 787.

Central City quadrangle: Bastin and Hill, 53.

Coal, Yampa field: Whiteside, 1135.

Cripple Creek, Cresson bonanzas: Patton, 788.

Gilpin County: Bastin and Hill, 53.

Gold Brick district, Gunnison County: Crawford and Worcester, 238.

Manganiferous iron ore, Red Cliff, Eagle County: Umpleby, 1056.

Oil shale, Green River formation: Winchester, 1158.

Dynamic and structural.

Foothills structure, northern Colorado: Ziegler, 1187, 1188.

Physiographic.

Gold Brick district, Gunnison County: Crawford and Worcester, 238.

Stratigraphic.

Bonanza district, Saguache County: Patton, 787.

Central City quadrangle: Bastin and Hill, 53.

Eocene glaciation, Summitville quadrangle: Atwood, 29.

Foothills structure, northern Colorado: Ziegler, 1188.

Gilpin County: Bastin and Hill, 53.

Colorado—Continued.**Paleontology.**

Florissant, bird remains: Shufeldt, 943.

Insecta: Cockerell, 212, 213.

beetles: Wickham, 1139.

Diptera: Cockerell, 211.

Petrology.

Bonanza district, Saguache County: Patton, 787.

Central City quadrangle: Bastin and Hill, 53.

Gilpin County: Bastin and Hill, 53.

Gold Brick district, Gunnison County: Crawford and Worcester, 238.

Mineralogy.

Gilpinite, Gilpin County: Larsen and Brown, 617.

Halloysite, Wagon Wheel Gap: Larsen and Wherry, 619.

Leverrierite, Saguache County: Larsen and Wherry, 620.

North Table Mountain: Wilson, 1150.

Rare mineral occurrences: Hills, 468.

Rhodochrosite, Lake County: Wherry, 1117.

Telluride (calaverite), Cripple Creek: Duce, 305.

Thuringite: Larsen and Stelger, 618.

Underground water.

San Luis Valley: Headden, 444.

Columbium.

General: James, 520.

Concretions.

Nebraska, Burnham, Dakota clays: Burnett, 145.

Ohio, Greenfield limestone: Napper, 746.

Origin: Moore, 748.

Conglomerates.

Classification: Moody, 742.

Congresses. See Associations.**Connecticut.****General.**

Report of Survey, 1915-16: Gregory, 401.

Physiographic.

Marine terraces, southeastern Connecticut: Hatch, 428.

Mineralogy.

General: Hoadley, 472.

Copper.

General: Emmons, 325; Weed, 1108.

Enrichment of ore deposits: Emmons, 324.

Alaska: Brooks, 124.

Copper River basin: Moffit, 739.

Prince William Sound: Johnson, 528.

Latouche and Knight Island dis-

Copper—Continued.

British Columbia, Phoenix district: Rickard, 862.

Vancouver and adjacent islands: Brewer, 117.

Vancouver Island, Sooke and Duncan areas: Clapp, 193.

California: Yale, 1183.

Engels: Graton and McLaughlin, 397.

Colorado, Central City quadrangle: Bastin and Hill, 53.

Cuba, Oriente, Cobre: Cfa, 192; López, 649.

Santa Clara, Manicaragua: Usera, 1057.

Eastern States: Hill, 465.

Idaho, Mackay region: Umpleby, 1054.

Manitoba: Campbell, 163.

Flin-Flon Lake: Callinan, 158.

Mexico, Puebla, Teziutlán: Gómez, 337.

Michigan: Hopper, 492.

Montana: Helkes, 447.

Nevada, Ely district: Spencer, 975.

New Mexico: Henderson, 449.

North Carolina, Virginina district: Laney, 608.

Ontario, Massey mine: Lincoln, 638.

Oregon: Yale, 1183.

South Dakota: Henderson, 450.

Texas: Henderson, 449.

Utah, Deep Creek district: Custer, 248.

Ophir district: Loughlin, 651.

Vermont: Jacobs, 512.

Virginia, Virginina district: Laney, 608.

Washington, Okanogan County: Handy, 418.

Wyoming: Henderson, 450.

Corals. See Anthozoa.**Correlation. See Stratigraphic.**

Corsicana oil and gas field, Texas: Matson and Hopkins, 697.

Costa Rica.**Economic.**

Manganese: Yonge, 1184.

Paleontology.

Echini: Jackson, 509.

Cretaceous.**Correlation.**

Montana and Wyoming: Hares, 424.

Stratigraphy.

Alberta, Athabasca River section: McLearn, 676.

Crowsnest field: Rose, 880.

foothills north of Grand Trunk Pacific railway: MacVicar, 681.

southern: Dowling, 296

Cretaceous—Continued.**Stratigraphy—Continued.**

- Colorado, northern: Ziegler, 1187.
 Georgia, Coastal Plain: Shearer, 936.
 Illinois, southern: Shaw, 934.
 Louisiana, De Soto-Red River field:
 Matson and Hopkins, 696.
 Maryland, Tolchester quadrangle:
 Miller *et al.*, 730.
 Massachusetts: Emerson, 321.
 Mississippi: Stephenson, 989.
 Montana, Blackfeet Indian Reserva-
 tion: Stebinger, 984.
 Bowdoin dome: Collier, 223.
 Bull Mountain coal field: Woolsey
 et al., 1178.
 Garrison-Phillipsburg fields: Pardee,
 780.
 Two Medicine formation: Stebinger,
 985.
 Montana and Wyoming, correlation:
 Hares, 424.
 Morrison and Sundance formations, re-
 lation: Lee, 625.
 Morrison formation, age: Schuchert,
 912.
 New Mexico, Deming quadrangle: Dar-
 ton, 257.
 Navajo country: Gregory, 402.
 North Dakota: Leonard, 633.
 volcanic ash bed: Stanton, 982.
 Tennessee, McNairy County: Wade,
 1072.
 Waynesboro quadrangle: Miser, 738.
 Texas, Corsicana field: Matson and
 Hopkins, 697.
 Palestine salt dome: Hopkins, 486.
 Thrall oil field: Udden and Bybee,
 1050.
 Tuscaloosa formation: Wade, 1073.
 delta character: Berry, 67.
 Wyoming: Trumbull, 1035.
 Big Horn Basin: Hewett, 461.
 Byron field: Ziegler, 1189.
 Frontier formation: Knowlton, 595.
 Oregon Basin field: Ziegler, 1190.

Paleontology.

- Alberta, Cheneosaurus: Lambe, 603.
 Edmontonosaurus, Edmonton forma-
 tion: Lambe, 604.
 Gorgosaurus: Lambe, 601.
 southern: Dowling, 296.
 Arkansas, Bingen sand, Plantæ: Berry,
 69.
 Kansas, Ogmodirus (plesiosaur): Wil-
 liston, 1149.
 Montana, Two Medicine formation,
 Reptilia: Gilmore, 878.

Cretaceous—Continued.**Paleontology—Continued.**

- Texas, Vertebrata: Hay, 432.
 Wyoming, Frontier formation: Knowl-
 ton, 595.
 Crinoidea. *See also* Echinodermata.
 Camarocrinus: Springer, 978.
 Embryo crinoid, structural features:
 Hudson, 500.
 Scyphocrinus: Springer, 978.
 Crustacea.
 Bibliography, Paleozoic: Vogdes, 1070.
 Brachyura (crabs), Cretaceous, South
 Dakota: Rathbun, 831.
 California, Pliocene, crab: Rathbun,
 832.
 Palæopalæmon lowensis, Kinderhook
 shale, Burlington: Walter, 1085.

Cryolite.

General: Burchard, 138.

Cryptogams. *See* Paleobotany.

Crystallography.

- General: Wintrigham, 1161.
 Apatite crystal, Auburn: Ford, 356.
 Crystal drawing and modelling: Blake,
 84.
 Growing crystals, linear force: Hos-
 tetter, 494.
 Plotting crystal zones on the sphere:
 Blake, 83.
 Pressure phenomena accompanying
 growth of crystals: Taber, 1011.
 Pyromorphite, crystals: Shannon, 926.
 Spencerite, crystal form: Walker, 1082.

Cuba. *See also* West Indies.**Economic.**

- General: Hayes *et al.*, 440.
 Climate, influence on ore formation:
 Aubouin, 31.
 Copper, Cobre, Oriente: Cla, 192; Lo-
 pez, 649.
 Manicaragua, Santa Clara: Usera,
 1057.
 Iron: Little, 644.
 Firmeza district, Oriente Province:
 Roesler, 871.
 Petroleum, Bacuranao: Brödermann,
 120.
 Puerto Principe: Aubouin, 32.

Stratigraphic.

- General: Hayes *et al.*, 440.
 Firmeza district, Oriente Province:
 Roesler, 871.

Paleontology.

- Mammalia: Allen, 13.
 Isle of Pines: Peterson, 797.

Petrology.

- Firmeza district, Oriente Province:

Denudation. *See* Erosion.

Deposition. *See* Sedimentation.

Deposition of ores. *See* Ore deposits.
origin.

Dermolith: Jaggar, 517.

Devonian.

Stratigraphy.

Alaska, Tolovana district: Mertie, 720.

Alberta, Athabasca River section: McLearn, 678.

Arizona, Warren district: Bonillas *et al.*, 92.

Arkansas, Caddo Gap and De Queen quadrangles: Miser, 737.

California: Smith, 962.

Colorado, Gold Brick district: Crawford and Worcester, 238.

Idaho, Mackay region: Umpleby, 1054.

Kentucky, Irvine field: Shaw, 932.

Massachusetts: Emerson, 321.

Michigan, Detroit district: Sherzer, 987.

Nevada, Ely district: Spencer, 975.

New Mexico, Deming quadrangle: Darton, 257.

southern: Darton, 258.

Ohio: Verwiebe, 1067.

Olentangy shale: Grabau, 393.

Pennsylvania: Verwiebe, 1067.

Heiderberg limestone: Reeside, 841.

Rocky Mountain region: Tomlinson, 1027.

Tennessee, Waynesboro quadrangle: Miser, 738.

western: Dunbar, 306.

Tully limestone and Genesee shale, relations: Grabau, 392.

Paleontology.

Ellesmere Land, Devonian corals: Loewe, 645.

Devonian fishes: Kier, 577.

Heiderberg limestone, Pennsylvania: Reeside, 841.

Tennessee, Rensselaerina, Linden shale: Dunbar, 307.

Diamonds.

California: Storms, 1005.

Diatoms.

Mexico: Diaz Lozano, 277.

Dikes.

New York, Blue Mountain quadrangle: Miller, 733.

Vermont, Calais, East Montpelier, and Berlin: Richardson, 853.

Dinosauria. *See* Reptilia.

Dip protractor: Wentworth, 1111.

Distribution. *See* Geographic distribution.

Dislocations. *See* Faulting.

District of Columbia.

Physiographic.

General: Wherry, 1119.

Petrology.

Igneous and metamorphic rocks: Fennner, 336.

Dolomite.

Origin: Steldtmann, 987.

Domes.

Coastal salt domes: Kennedy, 560.

Downwarping along joint planes: Burling, 141.

Drainage changes.

Iowa: Leighton, 628.

New York, Adirondack Mountains: Miller, 734.

upper Hudson Valley: Fairchild, 329.

Washington: Keyes, 566.

Dunes.

Indiana: Bailey, 33.

Dunkleberg mining district, Granite County, Montana: Pardee, 781.

Dynamic and structural (general). *For regional, see the various States. See also list of subject headings on p. 90.*

Baked shale and slag formed by burning of coal beds: Rogers, 874.

Chert in Burlington limestone, origin: Tarr, 1016.

Deformation of limestone: Newland, 752.

of rocks: Adams and Bancroft, 4.

of unconsolidated beds: Kindie, 581.

Downwarping along joint planes: Burling, 141.

Friction and limiting strength of rocks: King, 582.

Geosyncline, western interior: Van Tuyl, 1061.

"Giant ripples," formation: Bucher, 134.

Metamorphism, phases and definitions: Daly, 253.

Mud cracks: Kindie, 579.

Recurrent tetrahedral deformations and intercontinental torsions: Emerson, 322.

Ripple mark: Kindie, 580.

Rocks, internal friction during deformation and plasticity: Adams and Bancroft, 5.

Salt crystals, growth: Long, 647.

Silica, deposition: Lindgren, 641.

Water, geologic rôle: Fairchild, 328.

Earth, genesis of. *See also* Dynamic and structural (general).

General: Chamberlin, 189; Lees, 627.

Planetesimal hypothesis: Lees, 627.

Earth movements. *See* Landslides.

Earthquakes. *See also* Seismology.

General: Branner, 109.

Alabama, October 18, 1916: Finch, 345; Hopkins, 484.

California, 1916: Palmer, 777.

registration, April 1-September 30, 1916: Davis, 261.

registration, 1916-17: Davis, 262.

Santa Barbara channel: Mattel, 698.

southern and eastern: Hamlin, 417.

Tejon Pass, 1916: Branner, 110.

Iowa, April 9, 1917: Kay, 555.

January 30, 1917: Klotz, 585.

Earthquakes—Continued.

- Mexico, November 12, 1912; Montesus de Ballore, 740.
 Missouri, April 9, 1917: Finch, 346, 347; Paige, 775.
 North Carolina, August 26: Finch, 344.
 Panama, Almirante, April, 1916: Reid, 846.
 United States, 1916: Humphreys, 504.
Echinodermata. *See* Asteroidea; Blastoida; Crinoidea; Cystoidea; Echinoidea.
Echinoidea.
 California, Tertiary: Kew, 561.
 Costa Rica: Jackson, 509.
 Mexico, northeastern: Dickerson and Kew, 283.
 Panama Canal Zone: Jackson, 509.
Economic (general). *For regional see under the various States. See also* Ore deposits, origin, and the particular products.
 General: McLeod, 679.
 Classification of ore deposits: Quirke, 828.
 Common minerals and rocks: George, 371.
 Enrichment of ore deposits: Emmons, 324.
 Exploration of metalliferous deposits: Emmons, 326.
 Geology, relation to oil industry: McDowell, 670.
 Gneissic galena ore, British Columbia: Uglow, 1051.
 Public interest in mineral resources: Smith, 959.
 Role of mineralizers in ore segregations in basic igneous rocks: Singewald, 950.
 Silver ores, microscopic study: Guild, 409.
 Useful minerals: Schrader *et al.* 910.
 Veinlets in sedimentary rocks, origin: Taber, 1010.
 Zonal growth in hematite: Sosman and Hostetter, 974.
Edmontosaurus regalis, Edmonton formation: Lambe, 604.
 Ely district, Nevada: Spencer, 975.
 Enrichment of ore deposits: Emmons, 324.
 Eocene. *See* Tertiary.

Etchegoin Pliocene, middle California: Nomland, 758.

Evolution.

- General: Osborn, 768; Scott, 916.
 Genetics versus paleontology: Gregory, 406.

Excursions.

- American Association of State Geologists, field trip in Oklahoma: Hotchkiss, 496.

Experimental investigations.

- Deformation of rocks: Adams and Bancroft, 4.

Faulting.

- Cap-au-Grès fault: Keyes, 568.
 Colorado, northern: Ziegler, 1187, 1188.
 Hawaiian Islands: Powers, 814.
 Ontario, Espanola district: Quirke, 827.

Feldspar.

- General: Katz, 543.
 Fertilizers: Pogue, 809.

Fire clay.

- Illinois, Pennsylvania: Lines, 642.
 Union County, Mountain Glen: St. Clair, 889.

Fishes. *See* Pisces.

Fissures. *See* Faulting.

Florida.**Economic.**

- Mineral industries, 1916: Sellards, 917.
 Rare mineral deposit: Liddell, 637.
 Tallahassee region: Sellards, 919.

Physiographic.

- Tallahassee region: Sellards, 919.

Stratigraphic.

- Orthophragmina, stratigraphic value: Cooke, 232.
 Tallahassee region: Sellards, 919.
 Vero: Berry, 77; Chamberlin, 186, 187; Hay, 436; Sellards, 920, 922; Vaughan, 1063.

Paleontology.

- Aves, Vero: Shufeldt, 941, 942.
 Human remains, Vero: Hrdlička, 497; MacCurdy, 608; Sellards, 918, 920.
 Megatherium: Matthew, 703.
 Plantæ, Vero: Berry, 65, 66, 77.
 Vertebrata, Vero: Hay, 435, 436; Sellards, 920, 921.

Fluorapatite.

- Geologic history—Continued.**
- use lime- Marysville Buttes: Dickerson, 282.
 lson, 523. Colorado, Central City quadrangle:
 ichnites: Bastin and Hill, 53.
 Gold Brick district: Crawford and
 Worcester, 238.
 Cuba: Hayes *et al.*, 440.
 Florida: Oriente Province, Firmeza district:
 Roesler, 871.
 232. Florida, Tallahassee region: Sellards,
 5, 295. 919.
 Geosyncline, western interior: Van
 Tuyl, 1061.
 Grand Canyon: Darton, 260.
 Iowa, northwestern: Carman, 175.
 Kansas, Leavenworth quadrangle:
 Hinds and Greene, 471.
 Maine, Waterville: Little, 643.
 Maryland, Tolchester quadrangle:
 Miller *et al.*, 730.
 Massachusetts: Emerson, 321.
 Michigan, Detroit district: Sherzer,
 937.
 Missouri, Leavenworth quadrangle:
 Hinds and Greene, 471.
 Greger, Smithville quadrangle: Hinds and
 Greene, 471.
 1076. Montana, Boulder batholith: Billings-
 s: Wade, ley and Grimes, 80.
 Cretaceous: Thom, 1020.
 Garrison-Phillipsburg fields: Pardee,
 780.
 s, origin. Nevada, Big Smoky Valley: Meinzer,
 709.
 Washing- New Mexico, Deming quadrangle:
 Darton, 257.
 dipitants: southern: Darton, 258.
 New York, Adirondack Mountains:
 Miller, 734.
 rke and Blue Mountain quadrangle: Miller,
 733.
 s: Hicks, Ogdensburg region: Cushing, 245.
 analyses: North Carolina, Virgilia district:
 Laney, 608.
 constituents: North Dakota: Leonard, 633.
 07. Oklahoma, southern: Powers, 816.
 stitution: Pennsylvania, Lehigh County: Miller,
 728.
 Susquehanna River: Mathews, 694.
 Quebec, Northern Transcontinental
 Railway, Hervey Junction-
 Doucet: Bancroft, 37.
 Dickerson, Thetford-Black Lake district (Cole-
 raine sheet): Knox, 596.
 itology. Rhode Island: Emerson, 321.
 ce *Hst.*, p. Rocky Mountain region: Tomlinson,
 1027.
 oclimatol- Rocky Mountains, Canadian: Allan,
 11
 history: Tertiary: Berry, 72.
 onillas *et*

Geologic history—Continued.

- Wyoming: Trumbull, 1035.
 Byron field: Ziegler, 1189.
 Oregon Basin field: Ziegler, 1190.

Geologic maps.

- Alabama: Smith, 956.
 Hatchetigbee anticline: Hopkins, 488.
 Alaska, Anvik-Andreafski region: Harrington, 425.
 Copper River basin, economic: Moffitt, 739.
 Kantishna region: Capps, 174.
 Kennicott region: Moffitt, 739.
 Porcupine district: Eakin, 311.
 Prince William Sound, Latouche and Knight Island districts: Johnson, 529.
 Tolovana district: Mertie, 720.
 Alberta, Mountain Park coal area: Stewart, 993.
 southern: Dowling, 296.
 Arctic regions, Ellesmere Land: Klier, 577.
 Arizona, Mohave region: Schrader, 909.
 Mule Mountains: Bonillas *et al.*, 92.
 Warren district: Bonillas *et al.*, 92.
 British Columbia, Kootenay district, Slocan area: Drysdale, 303.
 Vancouver Island, Sooke and Duncan areas: Clapp, 193.
 Ymir area, West Kootenay district: Drysdale, 302.
 California, Camulos quadrangle: Warren, 1088.
 Colfax region: Moody, 742.
 Colorado Desert: Vaughan, 1064.
 McKittrick district: Gester, 372.
 Modoc County: Tucker, 1041.
 San Benito County, New Idria district: Bradley and Logan, 107.
 Canada, iron ore occurrences: Lindeman, 639.
 Coal, United States: Campbell, 165.
 Colorado, Bonanza district: Patton, 787.
 Gold Brick district: Crawford and Worcester, 238.
 Cuba: Hayes *et al.*, 440.
 Oriente Province, Firmeza district: Roesler, 871.
 Florida, Tallahassee region: Sellards, 919.
 Georgia, Coastal Plain: Shearer, 936.
 Idaho, Mackay region: Umpleby, 1054.
 Illinois, Colchester-McComb quadrangles: Hinds, 469.
 Iowa, northwestern, Pleistocene: Carman, 175.
 Pleistocene: Alden and Leighton, 10.
 Kansas, Leavenworth quadrangle: Hinds and Greene, 471.
 Kentucky, northeastern: Shaw, 932.
 Louisiana: Matson, 695.

Geologic maps—Continued.

- Maine, southwestern: Katz, 546.
 Manitoba, Big Clearwater Lake region: Dresser, 299.
 Schist Lake district: Bruce, 133.
 Wewusko Lake area: Bruce, 133.
 Maryland, Tolchester quadrangle: Miller *et al.*, 730.
 Massachusetts: Emerson, 321.
 Michigan: Allen *et al.*, 16; Smith, 967.
 Detroit district: Shcrzer, 937.
 Minnesota surface formations: Leverett and Sardeson, 635, 636.
 Mississippi, western: Wade, 1072.
 Missouri, Leavenworth quadrangle: Hinds and Greene, 471.
 Ozark region: Buehler, 137.
 Smithville quadrangle: Hinds and Greene, 471.
 Montana, Blackfeet Indian Reservation: Stebinger, 984.
 Bowdoin dome: Collier, 223.
 Bull Mountain coal field: Woolsey *et al.*, 1173.
 Garrison phosphate field: Pardee, 780.
 Navajo country: Gregory, 402.
 Nevada, Big Smoky Valley: Meinzer, 709.
 Ely quadrangle: Spencer, 975.
 Manhattan district: Ferguson, 337.
 New Hampshire, southeastern: Katz, 546.
 New Mexico, Deming quadrangle: Darton, 257.
 southern: Darton, 258.
 New York, Blue Mountain quadrangle: Miller, 733.
 Long Island: Fairchild, 330.
 Ogdensburg region: Cushing, 245.
 Saratoga district, Pleistocene: Fairchild, 329.
 North Carolina, Virgilina district: Laney, 608.
 North Dakota: Leonard, 633.
 Oklahoma: Beal, 59; Fath, 333.
 eastern: Shannon *et al.*, 924.
 Ontario, Espanola district: Quirke, 827.
 Gunflint area: Parsons, 784.
 Hunter Island: Parsons, 784.
 Lake Timiskaming: Hume, 503.
 Onaping area: Collins, 224.
 Ottawa area: Johnston, 534.
 Sudbury district, Asquith and Churchill townships: Collins, 224.
 Pennsylvania, eastern, Pre-Cambrian and Triassic diabase: Jonas, 537.
 Quebec, Grenville district: Wilson, 1154.
 Ottawa area: Johnston, 534.
 Thetford-Black Lake district (Cole-raine sheet): Knox, 596.
 Rhode Island: Emerson, 321.

Geologic maps—Continued.

- Tennessee, Waynesboro quadrangle: Miser, 738.
western: Wade, 1072.
Texas, Corsicana field: Matson and Hopkins, 697.
Palestine salt dome: Hopkins, 486.
United States (east of Rocky Mountains): Bowie, 97.
eastern, greensand deposits: Ashley, 27.
physiographic divisions: Fenneman, 334.
Vermont, Calais: Richardson, 853.
East Shoreham: Perkins, 794.
Grand Isle: Perkins, 794.
Isle La Motte: Perkins, 794.
mineral resources: Perkins, 795.
Montpellier: Richardson, 853.
Virginia: Watson, 1103.
Virgilia district: Laney, 608.
West Virginia, Braxton and Clay counties: Hennen, 451.
Wisconsin, Devil's Lake region: Trowbridge, 1031.
Wyoming: Trumbull, 1035.
Big Horn Basin: Hewett, 461.
Lodgepole Valley: Meinzer, 710.
Geological surveys. *See* Surveys.
Geomorphogeny. *See* Physiographic.
Geomorphology. *See* Physiographic.
Geomorphy.
Recurrent tetrahedral deformations and intercontinental torsions: Emerson, 322.

Geologic time.

- Measuring of postglacial time through sedimentation in lakes: Hotchkiss, 495.
Ontario basin: Coleman, 221.
Ontario shore line, age and origin: Spencer, 976.
Wave work as a measure of time: Coleman, 221.

Geophysics.

- Crystals, growing, linear force: Hostetter, 494.
Evaporation of water at depth by natural gases: Mills and Wells, 736.
Iron oxides: Day, 266.
Salt crystals, growth: Long, 647.
Sulphides, dissociation pressures: Allen and Lombard, 12.

Georgia.

Economic.

- Bauxite deposits, Coastal Plain: Shearer, 936.
Fuller's earth deposits, Coastal Plain: Shearer, 936.
Potash-bearing slates: McCallie, 664.

Stratigraphic.

- Coastal Plain: Shearer, 936.

Georgia—Continued.

Paleontology.

- Carapa, Eocene: Berry, 70.
Orthophragmina: Cushman, 247.

Mineralogy.

- Halloysite: Vander Meulen, 1059.
Geosyncline, western interior: Van Tuyl, 1061.

Germanium.

- General: Browning, 131.

Gilsonite.

- Origin: Richardson, 856.

Glacial erosion.

- California, Sierra Nevada: Muir, 745.
Montana, sublacustrine: Davis, 265.

Glacial geology. *See also* Quaternary.

- General: Manson, 686.
Beaches at south end of Lake Michigan, origin: Wright, 1177.
Cause of glacial epoch: Manson, 686; Reagan, 836.
Champlain sea in Lake Ontario basin: Mather, 692.
British Columbia, Vancouver Island, Sooke and Duncan areas: Clapp, 193.
California, Sierra Nevada: Muir, 745.
Colorado, Central City quadrangle: Bastin and Hill, 58.
Gold Brick district: Crawford and Worcester, 238.
Indiana, Vigo County, loess and sand dune deposits: McBeth, 662.
Iowa, Crawford and Carroll counties: Kay, 552.
Iowan glaciation: Leighton, 630.
northwestern: Carman, 175.
Pleistocene: Alden and Leighton, 10.
Iowan drift: Alden and Leighton, 10.
Kansas, Leavenworth quadrangle: Hinds and Greene, 471.
Maine, Waterville: Little, 643.
Manitoba, southeastern: Wallace, 1083.
Massachusetts: Emerson, 321.
Michigan, Detroit district: Sherzer, 937.
Minnesota, northeastern: Leverett and Sardeson, 636.
Missouri, Leavenworth quadrangle: Hinds and Greene, 471.
Smithville quadrangle: Hinds and Greene, 471.
Montana: Davis, 265.
Sun River region: Stebinger and Goldman, 986.
New Hampshire, White Mountains: Johnson, 532.
Newington moraine, New England: Katz and Keith, 547.
New York, Adirondack Mountains: Miller, 734.
Adirondacks and Catskills: Johnson, 532.
Blue Mountain quadrangle: Miller,

Glacial geology—Continued.

New York, etc.—Continued.

Irondequoit Valley: Chadwick, 181.

Long Island: Fairchild, 830.

Ogdensburg region: Cushing, 245.

upper Hudson Valley: Fairchild, 829.

Ohio, southern: Stout, 1008.

Ontario, Ottawa area: Johnston, 534.

Pennsylvania, first phase of glaciation:
Williams, 1142.

Quebec, Ottawa area: Johnston, 534.

Pontiac and Ottawa counties:
Keele, 556.

Vermont, Calais, East Montpelier, and
Berlin: Richardson, 853.

Green Mountains: Goldthwait, 382,
383.

Greensboro, Hardwick, and Wood-
bury: Jones, 538.

Washington, Skykomish Basin: Smith,
969.

Western United States: Leverett, 634.

White, Adirondack, and Catskill Moun-
tains: Johnson, 532.

Glacial lakes. *See also* Beaches; Shore
lines; Terraces.

Lake Agassiz: Johnston, 535.

Michigan, Detroit district: Sherzer,
937.

New York, Irondequoit Valley: Chad-
wick, 181.

Ontario: Mather, 692.

Pennsylvania: Williams, 1142.

Vermont: Fairchild, 327.

Glacial period. *See* Glacial geology.

Glaciers.

Canada: Coleman, 218.

Oregon, Mt. Jefferson: Hatch, 429.

Yoho Glacier, motion, 1914-16:
Wheeler, 1113.

Glass sand.

General: Fetteke, 340.

Gold.

General: Lindgren, 640.

Enrichment of ore deposits: Em-
mons, 324.

Alaska: Brooks, 124.

Anvik-Andreafski region: Harring-
ton, 425.

Fairbanks district: Mertie, 721.

Juneau belt: Eakin, 310.

Kantishna region: Capps, 174.

Nenana region: Maddren, 682.

Porcupine district: Eakin, 311.

Prince William Sound: Johnson,
528.

Seward Peninsula: Mertie, 722.

Tickel district: Moffit, 739.

Tolovana district: Mertie, 720.

Arizona: Helkes, 446.

Mohave region: Schrader, 909.

British Columbia, Hedley district:
Rickard, 861.

Rossland district: Bruce, 132.

Vancouver and adjacent islands:
Brewer, 117.

Gold—Continued.

British Columbia, etc.—Continued.

Ymir area, West Kootenay district:
Drysdale, 302.

California: Yale, 1183.

Colorado, Bonanza district: Patton,
787.

Central City quadrangle: Bastin and
Hill, 53.

Cripple Creek: Patton, 788.

Gold Brick district: Crawford and
Worcester, 238.

Eastern States: Hill, 465.

Manitoba: Campbell, 163.

southeastern: Dresser, 299.

Mexico: Ramirez, 830.

Puebla, Tetela del Oro: Honigmann,
479.

Montana, Helkes, 447.

Nevada, Cedar Range district: Tier-
nan, 1023.

Manhattan district: Ferguson, 337.

New Mexico: Henderson, 449.

North America: Lindgren, 640.

Nova Scotia, Queens and Shelburne
counties: Faribault, 331.

Ontario, Boston Creek area: Burrows
and Hopkins, 146.

Goodfish Lake area: Burrows and
Hopkins, 147.

Kirkland Lake district: Bateman, 56.

Kowkash area: Hopkins, 490.

Onaping area: Collins, 224.

Oregon: Yale, 1183.

Texas: Henderson, 449.

South Dakota: Henderson, 450.

United States, 1915: McCaskey, 666.

Washington, Okanogan County: Handy,
418.

Wyoming: Henderson, 450.

Yukon, Scroggie, Barker, Thistle, and
Kirkman creeks: Cairnes, 153.

Gold Brick district, Colorado: Crawford and
Worcester, 238.

Grahamite.

Origin: Richardson, 856.

Grand Canyon. *See* Arizona.

Granite.

Texas: Nash, 747.

Graphite.

General: Ferguson, 338.

Alaska, Seward Peninsula: Mertie, 722.

British Columbia, Cranbrook: De
Schmid, 273.

Mexico: Vivar, 1069.

Quebec, Buckingham area: Wilson,
1152.

Graptolites.

Vermont, Calais, East Montpelier, and
Berlin: Richardson, 853.

Graptolite shales, shallow water deposits:
Grabau and O'Connell, 394.

Gravel.

General: Stone, 1004.

Tennessee, western: Wade, 1074.

Gravity anomalies in locating salt domes:
Shaw, 935.

Gravimetric survey: Bowie, 98.

Greenland.*Stratigraphy.*

Carboniferous, northeastern Greenland :
Grönwall, 407.

Paleontology.

Carboniferous Brachiopoda, northeast-
ern Greenland : Grönwall, 407.

Mineralogy.

Siderite, Ivigtut : Wherry, 1117.

Greenland.

Analysis, methods : Hicks, 462.

United States, eastern : Ashley, 27.

Gypsum.

General : Stone, 1000, 1003.

Alberta, northern : Camsell, 167.

Hawaiian Islands.*Dynamic and structural.*

Aphrolith and dermolith : Jaggard, 517.

Kilauea, aa lava : Jaggard, 516.

cyclical variation in eruption : Wood,
1167.

lava lake, thermal gradient : Jaggard,
518.

volcanic phenomena : Jaggard, 515.

Mauna Loa, activity : Day, 267.

eruption 1916 : Wood, 1168.

lava flow, 1916 : Jaggard, 514.

Tectonic lines : Powers, 814.

Paleontology.

Amastira : Cooke, 281.

History, philosophy, etc.

Geological work in the Southwest :
Gould, 390.

Indiana : Blatchley, 87.

Huronian. See Pre-Cambrian.**Ice age. See Glacial geology.****Ice ages (ancient).**

Colorado, Summitville quadrangle,
Eocene glaciation : Atwood, 29.

Idaho.*Economic.*

Cœur d'Alene district, Success zinc-
lead deposit, genesis : Umpleby,
1053 ; Hershey, 453.

Mackay region : Umpleby, 1054.

Muldoon district : Finch, 343.

Phosphate : Bell, 62.

Physiographic.

Mackay region : Umpleby, 1054.

Stratigraphic.

Mackay region : Umpleby, 1054.

Paleontology.

Pliocene faunas : Merriam, 713.

Mineralogy.

Plattnerite, Cœur d'Alene district :
Shannon, 323.

Igneous and volcanic rocks—Continued.**General—Continued.**

Classification, quantitative miner-
alogical : Johannsen, 526.

Alaska, Tolovana district : Mertle, 720.

Arizona, Navajo country : Gregory, 402.

Warren district : Bonillas *et al.*, 92.

British Columbia, Rossland district :
Bruce, 132.

Vancouver Island, Sicker series :
Cooke, 238.

Sooke and Duncan areas : Clapp,
198.

Ymir area, West Kootenay district :
Drysdaile, 302.

California : Smith, 962.

southern, Morro Hill : Waring and
Waring, 1097.

Colorado, Bonanza district : Patton,
787.

Gold Brick district : Crawford and
Worcester, 238.

Central City quadrangle : Bastin and
Hill, 53.

Cuba, Oriente Province, Firmeza dis-
trict : Roesler, 871.

Idaho, Mackay region : Umpleby, 1054.

Kansas, granite : Powers, 818.

Maine, southwestern : Katz, 546.

Maryland, Tolchester quadrangle : Mil-
ler *et al.*, 730.

Massachusetts : Emerson, 321.

Mexico, northeastern : Gardas, 367.

Minnesota, Pigeon Point : Daly, 251.

Montana, Boulder batholith : Billings-
ley and Grimes, 80.

Nevada, Ely district : Spencer, 975.

New Hampshire, southeastern : Katz,
546.

New Mexico, Deming quadrangle : Dar-
ton, 257.

Navajo country : Gregory, 402.

New York, Adirondacks, anorthosite
body : Bowen, 96 ; Cushing, 246.

Blue Mountain quadrangle : Miller,
733.

Edwards district : Newland, 753.

Ogdensburg region : Cushing, 245.

North Carolina, Chapel Hill, diorites :
Smith, 966.

Kings Mountain district : Keith and
Sterrett, 558.

Virgilina district : Laney, 608.

Ontario, Onaping area : Collins, 224.

Pennsylvania, eastern : Jonas, 537.

Quebec, Northern Transcontinental
Railway, Hervey Junction-Dou-

Illinois.*General.*

Report State geologist, 1911-13: De Wolf, 275.

1913-15: DeWolf, 276.

Soils, Du Page County: Hopkins, 482.

Edgar County: Hopkins, 481.

Kane County: Hopkins *et al.*, 483.

Economic.

Clay, Mountain Glen, Union County: St. Clair, 889.

Coal: Young, 1185.

Colchester and Macomb quadrangles: Hinds, 470.

Gillespie and Mount Olive quadrangles: Lee, 623.

Jackson County: Cady, 151.

Colchester-Macomb quadrangle: Hinds, 469, 470.

Fire clay, Pennsylvanian: Lines, 642.

La Salle and Hennepin quadrangles: Cady, 152.

Mineral resources, 1911-12: Skewes, 952.

1913-14: Skewes, 953.

Oil, black shales: Ashley, 26.

Oil fields: Kay, 549.

Oil investigations, Saline, Johnson, Pope, and Williamson counties: Brokaw, 121.

Williamson, Union, and Jackson counties: St. Clair, 886.

Oil possibilities, Ava area: St. Clair, 887.

Centralla area: St. Clair, 888.

Hardin, Pope, and Saline counties: Butts, 150.

Petroleum in 1916: Kay, 548.

Plymouth field: Blatchley, 86.

Silica, southern Illinois: Holbrook, 474.

Physiographic.

Beaches at south end of Lake Michigan, origin: Wright, 1177.

Canton quadrangle, loess and drift, relations: Savage, 893.

Stratigraphic.

Alexandrian series: Savage, 892.

Ava area: St. Clair, 887.

Borings, Plymouth oil field: Blatchley, 86.

Cap-au-Grès fault: Keyes, 568.

Carboniferous, Massac County: Shaw, 934.

Centralla area: St. Clair, 888.

Colchester-Macomb quadrangles: Hinds, 469, 470.

Hardin, Pope, and Saline counties: Butts, 150.

Jackson County: Cady, 151.

La Salle and Hennepin quadrangles: Cady, 152.

Parallelism of eastern and western interior fields: Keyes, 576.

Saline, Johnson, Pope, and Williamson counties: Brokaw, 121.

Southern Illinois: Shaw, 934.

Illinois—Continued.*Stratigraphic—Continued.*

Williamson, Union, and Jackson counties: St. Clair, 886.

Paleontology.

Alexandrian series, fauna: Savage, 892.

Beetles, Sangamon peat: Wickham, 1140.

Insecta, Mazon Creek: Cockerell, 214.

Mississippian boulders, Chicago: Davis, 263.

Indiana.*General.*

History: Blatchley, 87.

Economic.

Oil, black shales: Ashley, 26.

Petroleum: Bownocker, 103.

Dynamic and structural.

Cave, Versailles: Bigney, 79.

Physiographic.

Beaches at south end of Lake Michigan, origin: Wright, 1177.

Lakes, Tippecanoe basin: Scott, 914, 915.

Loess and sand dune deposits, Vigo County: McBeth, 662.

Sand dunes: Bailey, 33.

Wabash River, ancient: McBeth, 663.

Stratigraphic.

Loess and sand dune deposits, Vigo County: McBeth, 662.

Paleontology.

Plantæ, lower Pennsylvanian: Jackson, 510.

Richmond fossils: Foerste, 351.

Indiana.

General: Browning, 131.

Insecta.

General: Cockerell, 210.

Colorado, Florissant: Cockerell, 212, 213.

beetles: Wickham, 1139.

Diptera: Cockerell, 211.

Illinois, Mazon Creek: Cockerell, 214.

beetles, Sangamon peat: Wickham, 1140.

Interrelations of fossil fuels: Stevenson, 991.

Intrusions. *See also* Dikes; Igneous and volcanic rocks; Laccoliths; Magmas.

Mexico, northeastern: Garñas, 367.

New York, Adirondacks: Bowen, 96; Cushing, 246.

Pigeon Point, Minnesota: Daly, 251.

Invertebrata (general). *See also* Anthozoa; Brachlopoda; Bryozoa; Crustacea; Echinodermata; Foraminifera; Insecta; Mollusca; Problematica; Spongida; Vermes.

Alexandrian series, Illinois and Missouri: Savage, 892.

Arctic regions, König Oscar and Heiberg Land: Tschernyschew and Stepanow, 4036.

California, Pliocene: Nomland, 758.

Invertebrata (general)—Continued.

- Martinez fauna, California: Waring, 1088.
 Michigan, Little Bay de Noquette, Richmond: Foerste, 352.
 Mount Whyte fauna: Walcott, 1080.
 Ontario, Wolfe Island, Trenton: Mather, 690.
 Richmond: Foerste, 351.
 Silurian, Ohio: Foerste, 350.
 Santo Domingo: Maury, 707.

Invertebrates, inorganic constituents:
 Clarke and Wheeler, 207.**Iowa.***General.*

Report of geological survey: Kay, 550.

Economic.

Mineral production, 1915: Kay, 551.

Dynamic and structural.

Earthquake, Iowa City, April 9: Kay, 555.

Post-Kansan erosion: Leighton, 628.

Physiographic.

General: Lees, 626.

Ocheyedan mound, Osceola County: Kay, 554.

Stratigraphic.

Buchanan gravels: Leighton, 629.

Cap-au-Grès fault: Keyes, 568.

Iowan drift: Alden and Leighton, 10.

Iowan glaciation: Leighton, 630.

Pleistocene, Crawford and Carroll counties: Kay, 552.

northwestern Iowa: Carman, 176.

Post-Kansan erosion: Leighton, 628.

Prairie du Chien-St. Peter unconformity: Trowbridge, 1030.

Table of formations: Keyes, 565.

Paleontology.

Camptothecium, Kansan drift: Grout, 408.

Cyathophyllum, Jones County: Thomas, 1021.

Palaepalaemon iowensis, Kinderhook shale, Burlington: Walter, 1085.

Iron.*General.*

Genesis: Sosman, 973.

Oxides: Day, 266.

Zonal growth in hematite: Sosman and Hostetter, 974.

Alaska: Whittier, 1187.

Seward Peninsula: Mertie, 722.

America: Leith, 631.

British Columbia: Whittier, 1187.

Vancouver and Texada islands: Brewer, 116.

California: Whittier, 1137.

Canada: Lindeman, 639; Robinson, 867.

Colorado, Central City quadrangle: Bastin and Hill, 53.

Eagle County. Red Cliff, manganese iron ore: Umpleby, 1056.

Iron—Continued.

Cuba: Little, 644.

Oriente Province, Firmesa district: Roessler, 871.

Lake Superior: Crowell & Murray, 240.

Maine, central, pyrrhotite: Bastin, 52.

Mexico, Lower California: Wittich, 1162.

Minnesota, Cuyuna district: Harder and Johnston, 420.

manganiferous ores: Harder, 419.

Mesabi iron range: Wolf, 1166.

titaniferous magnetites: Broderick, 119.

Ontario: Robinson, 868.

Gundfint area: Parsons, 784.

Hunter Island: Parsons, 784.

Onaping area: Collins, 224.

Oregon: Whittier, 1137.

Washington: Whittier, 1137.

Irvine oil field, Estill County, Kentucky: Shaw, 922.

Isostasy.

General: MacMillan, 680.

Distribution of isostatic compensation: Bowie, 101.

Evidences: Bowie, 100.

Geodetic evidence: Bowie, 99.

Gravimetric survey: Bowie, 98.

Gravity anomalies in locating salt domes: Shaw, 935.

Gravity investigations: Bowie, 97; Hayford, 442.

Jamaica.*Paleontology.*

Pelecypoda, Bowden fauna: Woodring, 1170.

Jurassic.*Stratigraphy.*

Alberta, Crowsnest field: Rose, 880.

Arizona, Navajo country: Gregory, 402.

British Columbia, Rossland district: Bruce, 132.

Telikwa River district, DoImage, 292.

Vancouver Island, Sicker series: Cooke, 233.

Sooke and Duncan areas: Clapp, 193.

Ymir area, West Kootenay district: Drysdale, 302.

California: Smith, 962.

Colfax region: Moody, 742.

Colorado, northern: Ziegler, 1187.

Montana, Bowdoin dome: Collier, 223.

Morrison and Sundance formations, relation: Lee, 625.

New Mexico, Navajo country: Gregory, 402.

Wyoming, Big Horn Basin: Hewett, 461.

Kansas.*Economic.*

Leavenworth quadrangle: Hinds and Greene, 471.

Kansas—Continued.*Economic*—Continued.

Manganese in Dakota sandstone :
Whitaker and Twenhofel, 1180
Petroleum : Gardner, 364.

Dynamic and structural.

Metamorphism, Silver City area : Twen-
hofel, 1044.

Physiographic.

Penepains : Beede, 61.
Leavenworth quadrangle : Hinds and
Greene, 471.

Stratigraphic.

Granite : Powers, 813.
Granite in borings : Taylor, 1016 ;
Wright, 1179.
Granite boulders associated with Penn-
sylvanian strata : Twenhofel,
1043.
Leavenworth quadrangle : Hinds and
Greene, 471.
Silver City area : Twenhofel, 1044.
Table of formations : Keyes, 564.

Paleontology.

Mastodon, Gomphotherium : Hay, 437.
Ogmodirus, Cretaceous plesiosaur :
Williston, 1149.
Vertebrata, Equus beds : Hay, 434.

Kaolin.

Quebec, Labelle County, Amherst
Township : Wilson, 1154.

Kentucky.*General.*

Mammoth Cave : Nelson, 750.

Economic.

Coal, Harlan County : Hodge, 473.
Oil, black shales : Ashley, 26.
Petroleum : Fuller, 360 ; Gardner, 365.
Irvine field : Shaw, 932.
Phosphate, central Kentucky : Phalen,
799.

Stratigraphic.

Central Kentucky : Phalen, 799.
Irvine oil field : Shaw, 932.
Table of geologic formations : Miller,
727.

Labrador.*Stratigraphic.*

Northeastern Labrador : Coleman, 219.

Lakes.

Devil's Lake, Wisconsin : Trowbridge,
1031.
Iceberg Lake, Glacier National Park :
Freeman, 358.
Indiana, Tippecanoe basin : Scott, 915.

Lakes, extinct.

Lake Bonneville, orographic origin :
Keyes, 573.

Lakes, glacial. *See* Glacial lakes.

Lamellibranchiata. *See* Pelecypoda.

Landslides.

North Carolina : Holmes, 475.
Panama Canal : Branner, 111 ; Miller,
729.

Lanthanum.

General : Schaller, 905.

Lava.

Aphrolith and dermolith : Jaggar, 517.
Bonanza district, Saguache County.
Colorado : Patton, 787.
California, southern, Morro Hill :
Waring and Waring, 1097.
Cooling of a lava surface : Day, 268.
Kilauea Lava lake, thermal gradient :
Jaggar, 518.
Lassen Peak lava, viscous nature :
Diller, 285.

Lead.*General.*

Enrichment of ore deposits : Em-
mons, 324.
Alaska : Brooks, 124.
Seward Peninsula : Mertie, 722.
Arizona : Helkes, 446.
Patagonia district : Schrader, 908.
Santa Rita district : Schrader, 908.
British Columbia, Slovan district :
Uglow, 1051.
California : Yale, 1183.
Idaho, Coeur d'Alene, Success mine :
Umpleby, 1053.
Mackay region : Umpleby, 1054.
Eastern States : Hill, 465.
Mexico, Puebla : Honigsmann, 480.
Missouri, Ozark region : Buehler, 137.
Montana : Helkes, 447.
Dunkleberg district : Pardee, 781.
New Mexico : Henderson, 449.
Oklahoma, Miami district : Perry, 796.
Ontario, Galetta : Newnam, 755.
Kingdon mine : Hardman, 421.
Oregon : Yale, 1183.
South Dakota : Henderson, 450.
Texas : Henderson, 449.
United States : Siebenthal, 945, 946.
Wyoming : Henderson, 450.
Wind River Mountains, Bull Lake
Creek rock slide : Branson, 112.

Leona rhyolite, California : Clark, 197.

Lignite. *See also* Coal.

Alaska, Kantishna region : Capps, 174.

Limestone.

General : Culln, 241 ; Smith, 967.
Arizona : Culln, 241.
Michigan : Smith, 967.
Quebec : Rouillard, 881.

Lithology. *See* Petrology.**Loess.**

Character and age : Leighton, 630.
Illinois, Canton quadrangle : Savage,
893.
Origin : Savage, 893.

Louisiana.*Economic.*

Belle Isle : Lucas, 655.
Clay : Matson, 695.
Natural gas, De Soto-Red River field :
Matson and Hopkins, 696.

Louisiana—Continued.**Economic—Continued.**

Petroleum : Gardner, 364.

De Soto-Red River field : Matson and Hopkins, 696.

Petroliferous mounds, origin : Chautard, 191.

Sulphur : Pogue, 810.

Physiographic.

Coastal region : Kennedy, 560.

Stratigraphic.

General : Matson, 695.

Belle Isle : Lucas, 655.

Coastal region : Kennedy, 560.

De Soto-Red River oil and gas field : Matson and Hopkins, 696.

Paleontology.

Goniatitis claborniana, Yegua formation : Berry, 78.

Lower Silurian. *See* Ordovician.

Magma. *See also* Intrusions.

Anorthosites : Bowen, 94.

Kilauea, lava lake, thermal gradient : Jaggar, 518.

cyclical variation in eruption : Wood, 1167.

Pigeon Point, Minnesota : Daly, 251.

Magmatic differentiation.

Ore genesis : Singewald, 951.

Magnete.

British Columbia, Bridge River district : Drysdale, 303.

Canada : Frechette, 357.

Nova Scotia, Inverness County : Hayes, 439.

Origin and geochemistry : Dolbear, 290.

Quebec, Grenville district : Wilson, 1153-1155.

Maine.**Economic.**

Pyrrhotite, central Maine : Bastin, 52.

Stratigraphic.

Newington moraine : Katz and Keith, 547.

Southwestern Maine : Katz, 546.

Waterville, Quaternary : Little, 643.

Paleontology.

Nuculites, Silurian, Washington County : Williams, 1143.

Pleistocene plants, marine clays : Berry, 75.

Mineralogy.

Apatite crystal, Auburn : Ford, 355.

Mammalia.

Aelurodon, Nebraska : Barbour and Cook, 43.

Artiodactyl, horned, Nebraska : Lull, 658.

Brontotherium, Lull, 658.

Mammalia—Continued.

Equus, Pleistocene, Yukon : Hay, 438.

Equus scotti, Rock Creek, Texas : Troxell, 1032.

Felidae, Rancho La Brea : Merriam, 712.

Lagomorph genera, systematic position : Dice, 276.

Mastodon, Gomphotherium, Kansas : Hay, 437.

South Carolina : Loomis, 648.

Megatherium, Florida : Matthew, 703.

Meteoreodon, Nebraska : Barbour and Cook, 42.

Mylodon, Rancho La Brea : Stock, 999.

pes : Stock, 995, 996.

Nothotherium, Rancho La Brea, California : Stock, 997, 998.

Pliocene faunas : Merriam, 711.

western United States : Merriam, 713.

Poebrotherium (camel), Oligocene, Nebraska : Troxell, 1034.

Porto Rico : Anthony, 20.

Seacow, Miocene, Maryland : Palmer, 779.

Tetrabelodon, Nebraska : Barbour, 41.

Titanoides, North Dakota : Gidley, 374.

Virginia, Saltville Valley : Peterson, 798.

Man, fossil.

General : Balch, 35 ; Corral, 236.

Antiquity of man : Shimek, 938.

Evolution : Barrell, 45.

Florida, Vero : Chamberlin, 187 ; Hrdlicka, 497 ; MacCurdy, 638 ; Sellards, 918, 920.

Loess and the antiquity of man : Shimek, 938.

Manganese.

General : Hewett, 460.

Geologic occurrence : Runner, 884.

Arkansas, Caddo Gap and De Queen quadrangles : Miser, 737.

California : Boalich, 90.

Colorado, Eagle County, Red Cliff, manganiferous iron ore : Umpleby, 1056.

Costa Rica : Yonge, 1184.

Kansas, central, Dakota sandstone : Whitaker and Twenhofel, 1130.

Montana, Phillipsburg : Umpleby, 1055.

Manitoba.**Economic.**

Building and ornamental stones : Parks, 783.

Copper : Campbell, 163.

Flin-Flon Lake copper district : Cal-

Manitoba—Continued.*Dynamic and structural.*

Boulders corroded by brine: Wallace, 1084.

Physiographic.

Lake Agassiz: Johnston, 535.

Stratigraphic.

Schist Lake and Wewusko Lake areas: Bruce, 133.

Southeastern Manitoba: Dresser, 299; Wallace, 1083.

Whitemouth River area, superficial deposits: Johnston, 536.

Map making. See Cartography.

Maps. See Cartography and Geologic maps.

Mariposa formation, breccias, Colfax, California: Moody, 742.

Maryland.*General.*

Geological Survey: Clark, 203.

Economic.

Tolchester quadrangle: Miller *et al.*, 730.

Physiographic.

Tolchester quadrangle: Miller *et al.*, 730.

Stratigraphic.

Greensand deposits: Ashley, 27.

Miocene: Olsson, 764.

Tolchester quadrangle: Miller *et al.*, 730.

Paleontology.

Sea cow, Miocene: Palmer, 779.

Underground water.

Tolchester quadrangle: Miller *et al.*, 730.

Massachusetts.*Dynamic and structural.*

Harvard seismographic report, 1015; Woodworth, 1172.

Stratigraphic.

General: Emerson, 321.

Newington moraine: Katz and Keith, 547.

Permo-Carboniferous banded glacial slate, Squantum: Sayles, 896.

Paleontology.

Triassic, Connecticut Valley: Lull, 856.

Petrology.

General: Emerson, 321.

Metamorphism.

General: Daly, 253.

Arizona, Warren district: Bonillas *et al.*, 92.

Classification of metamorphic rocks: Miller, 735.

Kansas, Silver City area, Twenhofel, 1044.

Nevada, Ely district: Spencer, 975.

Phases and definitions: Daly, 253.

Meetings. See Associations.

Mercury. See Quicksilver.

Meteorites.

Calcium phosphate in meteoric stones: Merrill, 719.

Canyon Diablo, Arizona: Meunier, 725.

Colby, Wisconsin: Ward, 1087.

Meteorites—Continued.

Meteorite collections, American Museum: Reeds, 840.

Origin: Berwerth, 78.

Plainview, Texas: Merrill, 718.

Radioactivity: Quirke and Finkelstein, 829.

Ruff's Mountain meteorite, iron phosphide in: Wherry, 1122.

Mexico.*General.*

Jacala, Hidalgo: Camacho, 160.

Panama straits, ancient: Dickerson, 281.

Economic.

Antimony, Fresnillo, Zacatecas: Amador, 17.

Building stone: Tello, 1019.

Naucalpan y Juisquillucan: Mexico, 724.

Cañada, Tetela de Ocampo, Puebla: Gómez, 386.

El Triunfo y San Antonio, Lower California: Bishop, 81.

Gold, minerals accompanying: Ramírez, 830.

Graphite: Vivar, 1069.

Hostotipaquillo, Jallaco: Cummings, 244; Ordóñez, 767.

Iron, Lower California: Wittich, 1162.

Isthmus of Tehuantepec: Hartley, 426.

Lead-silver, Puebla: Honigmann, 480.

Lower California: Castillo, 179.

Mineral deposits, geographic distribution: Aguilera, 7.

geologic distribution: Aguilera, 8.

Parral district, Chihuahua: Scalia, 898.

Petroleum: Day, 269; Wilson, 1151.

Isthmus of Tehuantepec: Hartley, 426.

Phosphate, Monterrey, Nuevo León: Flores, 348.

Potrillos, Durango: Potoni, 786.

Salines: Zarate, 1186.

Salt deposits, Ojo de Liebre, Lower California: Wittich, 1163.

San Miguel Tenango, Zacatlán, Puebla: Gómez, 388.

Santa María del Río, San Luis Potosí: Manzano, 687.

Santa Rosa, Muzquiz, Coahuila: Peña, 791.

Sierra del Carmen, Coahuila: Servín, 923.

Structural materials: Tello, 1019.

Tetela del Oro, Puebla: Honigmann, 479.

Teztlutlan, Puebla: Gómez, 387.

Tin: Anon, 1194.

Zacatecas, El Magistral district: Villafañá, 1068.

Dynamic and structural.

Earthquake, November 12, 1912: Montessus de Ballore, 740.

Stratigraphic.

Isthmus of Tehuantepec: Hartley, 426.

Mexico—Continued.

Stratigraphic—Continued.

- Lerma River, Mexico: Tello, 1018.
- Lower California, southern part: Helm, 448.
- Northeastern Mexico: Garfias, 367.
- Parral district, Chihuahua: Scalia, 898.
- Tertiary, Tuxpan: Dickerson, 284.

Paleontology.

- Apalachicola fauna, Lower California: Arnold and Clark, 25.
- Diatoms: Diaz Lozano, 277.
- Tertiary, northeastern Mexico: Dickerson and Kew, 283.
- Tuxpan: Dickerson, 284.

Mineralogy.

- Corundum, Fresnillo, Zacatecas: Castro, 180.

Mica.

- General: Schaller, 904.

Michigan.

Economic.

- Copper: Hopper, 492.
- Detroit district: Sherzer, 937.
- Iron, Lake Superior region: Crowell & Murray, 240.
- Limestones: Smith, 967.
- Mineral resources: Allen, 15.

Physiographic.

- Detroit district: Sherzer, 937.

Stratigraphic.

- Detroit district: Sherzer, 937.
- Geologic map: Allen *et al.*, 16.
- Richmond, Little Bay de Noquette, northern Michigan: Foerste, 352.

Paleontology.

- Richmond, Little Bay de Noquette, northern Michigan: Foerste, 352.

Mineralogy.

- Mirabilite, Houghton: Peck, 790.
- origin: Lane, 607.

Military geology: Pogue, 807.

Mineragraphy, technique: Whitehead, 1134.

Mineral production of United States in 1915: McCaskey, 665.

Mineral resources. *See also* Economic (general).

- United States, useful minerals: Schrader *et al.*, 910.

- Useful minerals: Schrader *et al.*, 910.

Mineralogy (general). *See also* Meteorites; Technique. *For rept nat, see names of States. For particular minerals, see list, p. 156.*

- General: Foote Mineral Company, 353; McLeod, 679; Spencer, 977.

- Amorphous minerals: Rogers, 872.

Mineralogy (general)—Continued.

- Collection, Colorado State Bureau of Mines: Duce, 304.

- Colloid minerals: Greenland, 399.

- Common minerals and rocks: George, 371.

- Crystal drawing and modeling: Blake, 84.

- Crystal growth: Wright and Hostetter, 1176.

- Decimal grouping of plagioclases: Calkins, 157.

- Descriptive mineralogy: Bayley, 58.

- Developing crystallized mineral specimens: Hawkins, 430.

- Etching figures, hexagonal-alternating crystals: Honess, 477.

- Gel minerals: Greenland, 399.

- Growing crystals, linear force: Hostetter, 494.

- Hamlinite, identity with goyasite: Schaller, 899.

- Hancock collection: Wolff, 1165.

- Hydrogiobertite a mixture: Larsen, 610.

- Mellinite and gehlenite, constitution: Clarke, 205.

- Minasragrite: Schaller, 901.

- Mineragraphy, technique: Whitehead, 1134.

- Native element minerals, nomenclature and classification: Wherry, 1120.

- Native elements, occurrence: Wherry, 1124.

- Neodymium, cause of red-violet color in certain minerals: Wherry, 1116.

- Nephelites: Bowen, 98.

- Plagioclases, decimal grouping: Calkins, 157.

- Plotting crystal zones on the sphere: Blake, 83.

- Pressure phenomena accompanying growth of crystals: Taber, 1011.

- Pyromorphite, crystals: Shannon, 926.

- Quartz, colored varieties: Watson, 1107.

- Ruff's Mountain meteorite, iron phosphide in: Wherry, 1122.

- Rutile, black, and strueverite, identity: Headden, 443.

- Seleniferous sulphur: Brown, 127.

- Silica, deposition: Lindgren, 641.

- Silver minerals: Guild, 409.

- Spencerite, crystal form: Walker, 1082.

- Textbook: Moses and Parsons, 744; Spencer, 977.

Minerals described. *See list, p. 136.*

Minnesota.

General.

Geological Survey, report for 1914-15: Emmons, 323.

Economic.

Iron, Cuyuna district: Harder and Johnston, 420.

Lake Superior region: Crowell & Murray, 240.

Mesabi range: Wolff, 1166.

Manganiferous iron ores, Cuyuna district: Harder, 419.

Mesabi iron range: Wolff, 1166.

Peat: Soper, 971.

Titaniferous magnetites, northeastern Minnesota: Broderick, 119.

Physiographic.

Northeastern Minnesota: Leverett and Sardeson, 636.

Stratigraphic.

Cuyuna district: Harder, 419; Harder and Johnston, 420.

Map, surface formations: Leverett and Sardeson, 635.

Mesabi iron range: Wolff, 1166.

Northeastern Minnesota: Broderick, 119.

Pigeon Point: Daly, 251.

Surface formations: Leverett and Sardeson, 636.

Petrology.

Cuyuna district: Harder and Johnston, 420.

Pigeon Point: Daly, 251.

Titaniferous magnetites, northeastern Minnesota: Broderick, 119.

Miocene. *See Tertiary.*

Miscellaneous. *See also Addresses.*

Ethics of petroleum geologist: Clapp, 194.

Hints to prospective geologists: Udden, 1047.

Military geology: Pogue, 807.

Mississippi.

Economic.

Oil and gas possibilities: Crider, 239.

Stratigraphic.

General: Crider, 239.

Cretaceous tongues: Stephenson, 989.

Paleontology.

Goniatites claborniana, Lisbon formation: Berry, 73.

Meridian plants: Berry, 72.

Mississippian. *See Carboniferous.*

Missouri.

General.

State geologist, biennial report: Buehler, 136.

Economic.

Barite: Tarr, 1014.

Lead, Joplin district: Buehler, 137.

Ozark region: Buehler, 137.

Leavenworth quadrangle: Hinds and Greene, 471.

Mineral resources: Buehler, 136.

Ozark region: Buehler, 137.

Missouri—Continued.

Economic—Continued.

Smithville quadrangle: Hinds and Greene, 471.

Zinc, Joplin district: Buehler, 137.

Dynamic and structural.

Earthquake, April 9, 1917: Finch, 346, 347; Paige, 775.

Physiographic.

Leavenworth quadrangle: Hinds and Greene, 471.

Smithville quadrangle: Hinds and Greene, 471.

Stratigraphic.

Alexandrian series: Savage, 892.

Cap-au-Grès fault: Keyes, 568.

Columbia, section: Branson, 118.

Leavenworth quadrangle: Hinds and Greene, 471.

Ozark region: Buehler, 137.

Parallelism of eastern and western interior fields: Keyes, 576.

Smithville quadrangle: Hinds and Greene, 471.

Table of formations: Keyes, 562.

Paleontology.

Alexandrian series, fauna: Savage, 892.

Mississippian faunas, Phelps County: Bridge, 118.

Mineralogy.

Diasporite, Rosebud: Wherry, 1128.

Molding sand.

Foundry molding sands: Cole, 215.

Mollusca. *See also Cephalopoda; Gastropoda; Pelecypoda.*

California, Santa Margarita beds: Nomland, 759.

Melaneid mollusks, Pacific region: Bartsch, 47.

Nassidae, Tertiary: Harold, 452.

Oligocene, Washington: Dickerson, 279.

Ripley fauna, Tennessee: Wade, 1072.

Santo Domingo: Maury, 707.

Oligocene: Pilabry and Johnson, 806.

Molluscoldea. *See Brachiopoda; Bryozoa. Molybdenum.*

General: Hess, 455; Horton, 493.

Occurrence: Ball, 36.

Arizona, Hualpai Mountains: Wickes, 1188.

British Columbia, Lilloet mining division: Drysdale, 303.

Manitoba, Falcon Lake: DeLury, 271.

Quebec, Quyon: Camsell, 168.

Monasite.

United States: Pratt, 818.

Montana.

Economic.

Anticlines, Blackfeet Indian Reservation: Stebinger, 984.

Bull Mountain coal field, Mussellshell and Yellowstone counties: Woolsey *et al.*, 1173.

Dunkleberg mining district, Granite County: Pardee, 781.

Fergus County: Freeman, 359.

Manganese, Phillipsburg: Umpleby, 1055.

Montana—Continued.

Economic—Continued.

Mineral production, 1916: Helkes, 447.
Phosphate, Garrison-Phillipsburg fields: Pardee, 780.

Dynamic and structural.

Anticlines, Blackfoot Indian Reservation: Stebinger, 984.
Baked shale and slag formed by burning of coal beds: Rogers, 874.
Blackfoot Indian Reservation: Stebinger, 984.
Sublacustrine glacial erosion: Davis, 265.

Physiographic.

Iceberg Lake, Glacier National Park: Freeman, 358.
Pre-Jurassic base-leveling: Condit, 227.
Sublacustrine glacial erosion: Davis, 265.

Stratigraphic.

Blackfoot Indian Reservation: Stebinger, 984.
Boulder batholith: Billingsley and Grimes, 80.
Bowdoin dome, Montana: Collier, 223.
Bull Mountain coal field, Musselshell and Yellowstone counties: Woolsey et al., 1173.
Cambrian: Walcott, 1078.
Cretaceous formations, correlation: Hares, 424.
Cretaceous seacoast: Thom, 1020.
Dunkleberg mining district, Granite County: Pardee, 781.
Garrison-Phillipsburg region: Pardee, 780.
Glaciation: Davis, 265.
Gordon Mountain section: Walcott, 1079.
High gravels, age: Collier, 222.
Pleistocene, Sun River region: Stebinger and Goldman, 986.
Rocky Mountain region, Paleozoic: Tomlinson, 1027.
Two Medicine formation: Stebinger, 985.

Paleontology.

Albertella fauna: Walcott, 1079.
Blastoidea and Brachiopoda, Carboniferous, southwestern Montana: Clark, 201.
Brachyceratops, Two Medicine formation: Gilmore, 378.

Petrology.

Baked shale and slag formed by burning of coal beds: Rogers, 874.

Mineralogy.

Epiboulangerite, Superior district: Shannon, 997.

Mounds.

Coastal region, Gulf of Mexico: Kennedy, 560.

Origin: Kennedy, 560.

Mud cracks: Kindle, 579.

Natural gas.

General: Arnold, 28.
Accumulation, diastrophic theory: Daly, 249.
Anticlinal theory: White, 1133.
Diastrophic theory of oil and gas accumulation: Daly, 249.
Evaporation of water at depth by natural gases: Mills and Wells, 736.
Practical value of oil and gas bureaus: Matteson, 699.
Structural classification of natural gas fields: Clapp, 195.

Alberta: Slipper, 954.

Appalachian geosyncline, deep sand possibilities, West Virginia: Reger, 844.

Montana, Bowdoin dome: Collier, 223.

Louisiana, De Soto-Red River field: Matson and Hopkins, 696.

Ohio, Cleveland field: Rogers, 875.

Cleveland: Van Horn, 1060.

Vinton County, Richland township: Panyity, 789.

Oklahoma: Shannon et al., 924.

Bristow quadrangle, Fath, 833.

Cushing field: Beal, 59.

Texas, Corsicana field: Matson and Hopkins, 697.

West Virginia, Braxton and Clay counties: Hennen, 451.

Wyoming, Big Horn Basin: Hewett, 461.

Byron field: Ziegler, 1189.

Oregon Basin field: Ziegler, 1190.

Navajo country: Gregory, 402.

Nebraska.

Economic.

Natural fuels: Barbour, 88.

Pumicite: Barbour, 40.

Volcanic ash: Barbour, 40.

Paleontology.

Aelurodon, Cherry County: Barbour and Cook, 43.

Amphibian, Tertiary: Cook, 230.

Dinacrotorium, Pleistocene, Cass County: Barbour, 89.

Meteoreodon, Brown County: Barbour and Cook, 42.

Poebrotherium (camel), Oligocene: Troxell, 1032.

Nevada.*Economic.*

Cedar Range, Nye County: Stevens, 990.

Ely district: Spencer, 975.

Gold, Cedar Range district: Tiernan, 1023.

Manhattan district: Ferguson, 337.

Silver, halogen salts, Wonder: Burgess, 140.

Dynamic and structural.

Earthquake crevices: Reid, 848.

Physiographic.

Big Smoky Valley: Meinzer, 709.

Manhattan district: Ferguson, 337.

Stratigraphic.

Big Smoky Valley: Meinzer, 709.

Cambrian: Walcott, 1078.

Cedar Range, Nye County: Stevens, 990.

Clayton Valley: Meinzer, 709.

Ely district: Spencer, 975.

Manhattan district: Ferguson, 337.

Paleontology.

Pliocene faunas: Merriam, 713.

Mineralogy.

Ely district: Spencer, 975.

Famatinite, Goldfield: Shannon, 928.

Silver, halogen salts, Wonder: Burgess, 140.

Underground water.

Alkali Spring Valley: Meinzer, 709.

Big Smoky Valley: Meinzer, 709.

Clayton Valley: Meinzer, 709.

New Brunswick.*Economic.*

Coal: Brown, 128; Gray, 398.

Gloucester County: Hayes, 489.

Galena, York County: Cairnes, 155.

Road materials, St. John: Hayes, 489.

Tungsten: Camell, 169.

Burnt Hill: Cairnes, 155.

Dynamic and structural.

Folding in gypsum layers: Andrée, 19.

New Hampshire.*Physiographic.*

Snow arch, Tuckermans Ravine, Mount Washington: Goldthwait, 384.

White Mountains, local glaciation, date: Johnson, 532.

Stratigraphic.

Newington moraine: Katz and Keith, 547.

Southeastern New Hampshire: Katz, 546.

White Mountains, local glaciation, date: Johnson, 532.

New Jersey.*General.*

State geologist's report, 1916: Kimmel, 600.

Economic.

Mineral industry, 1915: Kimmel, 600.

Stratigraphic.

Greensand deposits: Ashley, 27.

Quaternary: Salisbury and Knapp, 890.

New Jersey—Continued.*Mineralogy.*

Franklinite, Franklin: Phillips, 802.

Pectolite after quartz, Paterson: Glenn, 380.

Pyrite and stilbite: Honess, 478.

Thaumasite, West Paterson: Wherry, 1123.

New Mexico.*Economic.*

Deming quadrangle: Darton, 257.

Mineral production, 1916: Henderson, 449.

Navajo country: Gregory, 402.

Physiographic.

Deming quadrangle: Darton, 257.

Navajo country: Gregory, 402.

Stratigraphic.

Deming quadrangle: Darton, 257.

Navajo country: Gregory, 402.

Paleozoic sections, southern New Mexico: Darton, 258, 259.

Permian, Pecos Valley: Wrather, 1174.

San Simon Valley: Schwennesen, 913.

Table of formations: Keyes, 563.

Paleontology.

Eryopsoides, Permian: Douthitt, 294.

Underground water.

Deming quadrangle: Darton, 257.

San Simon Valley: Schwennesen, 913.

New York.*General.*

Catskill Aqueduct geology: Berkey, 64.

Economic.

Edwards zinc pyrite deposits: Newland, 758.

Mining and quarry industry, 1915: Newland, 751.

Petroleum: Fuller, 860.

Pyrite, northern New York: Newland, 754.

Dynamic and structural.

Faulting, eastern New York: Chadwick, 182.

Long Island, postglacial marine submergence: Fairchild, 380.

Physiographic.

Adirondack and Catskill Mountains, local glaciation, date: Johnson, 532.

Adirondack Mountains: Miller, 734.

Blue Mountain quadrangle: Miller, 733.

Hudson Valley, upper: Fairchild, 329.

Irondequoit Valley, glacial history: Chadwick, 181.

Long Island: Fairchild, 380.

Stratigraphic.

Adirondack and Catskill Mountains, local glaciation, date: Johnson, 532.

Adirondack Mountains: Miller, 734.

Anorthosite body in Adirondacks: Bowen, 96; Cushing, 246.

Blue Mountain quadrangle: Miller, 733.

Cayuga waterlimes, western New York: Chadwick, 184.

New York—Continued.

Stratigraphic—Continued.

Edwards zinc pyrite deposits: Newland, 753.

Glaciation, local, Catskill Mountains: Rich, 851.

Graptolite zones of Utica shale: Ruedemann, 883.

Irondequoit Valley, glacial history: Chadwick, 181.

Lockport-Guelph section, Rochester: Chadwick, 183.

Long Island, postglacial: Fairchild, 380.

Ogdensburg region: Cushing, 245.

Postglacial, upper Hudson Valley: Fairchild, 329.

Trenton and Black River formations: Coryell, 237.

Paleontology.

Trenton and Black River formations: Coryell, 237.

Petrology.

Blue Mountain quadrangle: Miller, 733.

Mineralogy.

Calcite, green, Glens Falls: Koch, 597.

Garnets, New York City: Manchester and Stanton, 684.

Nickel.

General: Hess, 454; Royal Ontario Nickel Commission, 882.

Ontario: Royal Ontario Nickel Commission, 882.

Sudbury: Bateman, 54; Coleman, 220.

origin: Tolman, 1025.

Nitrate.

Origin in cliffs and ledges: Gale, 362.

Nomenclature. *See also under Stratigraphic.*

Amorphous minerals: Rogers, 872.

Aphrolith and dermolith: Jaggar, 517.

Dermolith: Jaggar, 517.

Igneous rocks: Johannsen, 526.

Metamorphic rocks: Miller, 735.

Minerals: Wherry, 1114.

native element: Wherry, 1120.

Pre-Cambrian: Keyes, 567.

Tongue: Stephenson, 989.

North Carolina.

General.

State geologist's report, 1915-16: Pratt, 817.

Economic.

Kings Mountain district: Keith and Sterrett, 558.

Tin, Kings Mountain district: Keith and Sterrett, 558.

Virgilina district: Laney, 608

North Carolina—Continued.

Stratigraphic—Continued.

Orange County: Smith, 965.

Pliocene, Orange County: Smith, 964.

Virgilina district: Laney, 608.

Petrology.

Diorites, Chapel Hill: Smith, 966.

Virgilina district: Laney, 608.

North Dakota.

Stratigraphic.

Cretaceous volcanic ash bed: Stanton, 982.

Geologic history: Leonard, 633.

Paleontology.

Titanoides: Gidley, 374.

Northwest Territory.

Economic.

Great Slave Lake: Cameron, 161.

Stratigraphic.

Great Slave Lake: Cameron, 161.

Novaculite.

Arkansas, Caddo Gap and De Queen quadrangles: Miser, 737.

Nova Scotia.

Economic.

Coal: Brown, 128; Gray, 398.

Gold-bearing series, Queens and Shelburne counties: Faribault, 331.

Iron, Londonderry: Hayes, 439.

Pictou County: Hayes, 439.

Magnetite, Inverness County: Hayes, 439.

Stirling zinc-copper-lead deposits, Cape Breton: Cairnes, 155.

Tungsten: Camsell, 169.

Dynamic and structural.

Deformation of unconsolidated beds: Kindle, 581.

Physiographic.

Cape Breton Island, physiographic divisions: Goldthwait, 335.

Stratigraphic.

Annapolis and Kings counties: Hayes, 439.

Ohio.

Economic.

Clinch gas pools: Panyity, 789.

Coal fields: Bownocker, 104.

Coal tonnage: Clark, 198.

Natural gas, Cleveland field, Cuyahoga County: Rogers, 875; Van Horn, 1060.

Richland township, Vinton County: Panyity, 789.

Oil, black shales: Ashley, 26.

Petroleum: Bownocker, 103; Fuller, 360.

Cleveland: Van Horn, 1060.

Southern Ohio: Stout, 1008.

Dynamic and structural.

Ohio—Continued.**Stratigraphic—Continued.**

- Cleveland gas field, Cuyahoga County : Rogers, 875.
 Devonian shales : Verwiebe, 1067.
 Glaciation : Haas, 412.
 Linton deposits, origin : Case, 178.
 Mississippian : Verwiebe, 1066.
 Olentangy shale : Grabau, 893.
 Silurian : Foerste, 350.
 Southeastern Ohio : Case, 178.
 Southern Ohio : Stout, 1008.
 Winchester, Richmond group : Foerste, 349.

Paleontology.

- Linton fauna, environment : Case, 178.
 Silurian : Foerste, 350.

Petrology.

- Oil field rocks, southeastern Ohio : Goldman, 381.

Oil. See Petroleum.**OH shales.**

- Green River field : Winchester, 1158.
 United States : Winchester, 1158, 1159.

Oklahoma.**Economic.**

- American Association of State Geologists, field trip in Oklahoma : Hotchkiss, 496.

Geonomic.

- Miami district : Perry, 796.
 Natural gas : Shannon *et al.*, 924.
 Oil and gas possibilities, Bristow quadrangle : Fath, 333.
 Petroleum : Gardner, 364 ; Hager, 414 ; Shannon *et al.*, 924.
 age in southern Oklahoma : Powers, 816.
 anticlinal theory, evidence on : Hager, 418.
 Cushing field, petroleum : Conkling, 228.
 Haldton oil field : Powers, 815.

Stratigraphic.

- Bristow quadrangle, Creek County : Fath, 333.
 Cushing oil and gas field : Beal, 59.
 Haldton oil field : Powers, 815.
 Miami district : Perry, 796.
 Ordovician beneath Haldton oil field : Powers, 812.
 Pennsylvanian, correlation : Bloesch, 88.
 Post-Permian, north central Oklahoma : Bloesch, 89.
 Pottsville formations : Mather, 689.
 Southern Oklahoma : Powers, 816.

Paleontology.

- Footprints, Pawhuska, Pennsylvanian : Jillson, 523.
 Pleistocene fauna : Troxell, 1033.

Ontario.**General.**

- London area : Stansfield, 980.

Economic.

- Algoma district : Tanton, 1013.

Ontario—Continued.**Economic—Continued.**

- Bureau of Mines, report, 1916 : Gibson, 373.
 Copper, Massey mine : Lincoln, 638.
 Gold, Boston Creek area : Burrows and Hopkins, 146.
 Goodfish Lake area : Burrows and Hopkins, 147.
 Kowkash area : Hopkins, 490.
 Iron : Robinson, 868.
 Gunflint area : Parsons, 784.
 Hunter Island : Parsons, 784.
 Iron pyrites, southeastern Ontario : Hopkins, 489, 491.
 Kingdon lead mine : Hardman, 421.
 Kirkland Lake gold district : Bateman, 56.
 Lake Huron, north shore : Collins, 225.
 Lead, Galetta : Newnam, 755.
 Nickel : Royal Ontario Nickel Commission, 882.
 Northern Ontario : Whitman, 1136.
 Onaping area : Collins, 224.
 Petroleum : Miller, 731.
 Petrolia field : Stansfield, 979.
 Road materials : Reinecke, 849, 850.
 Trenton-Napanee : Clark, 199.
 Silver, Cobalt : Bastin, 51.
 Sudbury district : Tanton, 1013.
 Sudbury minerals, quantitative measurement : Dresser, 801.
 Sudbury ore deposits, genesis : Bateman, 54 ; Coleman, 220 ; Corless, 235 ; Dresser, 801 ; Tolman and Rogers, 1025.
Dynamic and structural.
 Deformation of unconsolidated beds : Kindle, 581.
Physiographic.
 Champlain sea in Lake Ontario basin : Mather, 692.
 Espanola district : Quirke, 827.
 Lake Agassiz : Johnston, 535.
 Ontario shore line, age and origin : Spencer, 976.
Stratigraphic.
 Algoma district : Tanton, 1013.
 Boston Creek gold area : Burrows and Hopkins, 146.
 Espanola district : Quirke, 827.
 Glauconitic unconformity, Devonian : Andrée, 19.
 Goodfish Lake gold area : Burrows and Hopkins, 147.
 Hudson Bay region : Savage and Van Tuyl, 894.
 Hunter Island iron deposits : Parsons, 784.
 James Bay region : Savage and Van Tuyl, 894.
 Kowkash gold area : Hopkins, 490.
 Lake Huron, north shore : Collins, 225.
 Lake Timiskaming area, Paleozoic rocks : Hume, 503.
 Onaping area : Collins, 224.
 Ontario basin : Coleman, 221.

Ontario—Continued.**Stratigraphic—Continued.**

- Petrolia oil field: Stansfield, 979.
 Pleistocene, Ottawa area: Johnston, 534.
 Rockwood anticline: Williams, 1146.
 Southwestern Ontario: Williams, 1145.
 Sudbury district: Tanton, 1013.
 Toronto region: Coleman, 221.

Paleontology.

- Trenton, Wolfe Island: Mather, 690.

Petrology.

- Onaping area: Collins, 224.
 Sudbury minerals, quantitative measurement: Dresser, 301.

Mineralogy.

- Cobalt minerals: Ellsworth, 320.
 Euxenite, South Sherbrooke: Miller and Knight, 732.

Ontario shore line, age and origin:
 Spencer, 976.**Ordovician.****Correlation:** Raymond, 883.**Stratigraphy.**

- Arkansas, Caddo Gap and De Queen quadrangles: Miser, 737.
 California: Smith, 962.
 Colorado, Gold Brick district: Crawford and Worcester, 288.
 Idaho, Mackay region: Umpleby, 1054.
 Kentucky, central: Phalen, 799.
 Irvine field: Shaw, 982.
 Manitoba, Schist Lake district: Bruce, 133.
 southeastern: Wallace, 1068.
 Wewusko Lake area: Bruce, 133.
 Massachusetts: Emerson, 321.
 Michigan, Little Bay de Noquette: Foerste, 352.
 Missouri, Ozark region: Buehler, 187.
 Nevada, Ely district: Spencer, 975.
 New Mexico, Deming quadrangle: Darton, 257.
 southern: Darton, 258.
 New York, Adirondack Mountains: Miller, 734.
 Ogdensburg region: Cushing, 245.
 North Carolina, Virgilina district: Laney, 608.
 Ontario, Lake Timiskaming: Hume, 503.
 Pennsylvania, Cumberland-Lebanon Valley: Stose, 1007.
 Quebec, Lake St. John basin: Dresser, 298.
 Rocky Mountain region: Tomlinson, 1027.
 St. Peter sandstone, origin: Trowbridge, 1029.
 Tennessee, Highland Rim: Purdue, 825.
 Waynesboro quadrangle: Miser, 738.
 Trenton and Black River formations, New York: Coryell, 237.
 Utica shale, graptolite zones: Ruedemann, 883.

Ordovician—Continued.**Stratigraphy—Continued.**

- Vermont, Calais, East Montpelier, and Berlin: Richardson, 853.
 Vermont, western: Perkins, 794.
 Virginia, Virgilina district: Laney, 608.

Paleontology.

- Michigan, Little Bay de Noquette: Foerste, 352.
 Ontario, Wolfe Island, Trenton: Mather, 690.
 Richmond fossils: Foerste, 351.
 Trenton and Black River formations, New York: Coryell, 237.
 Trenton, Wolfe Island, Ontario: Mather, 690.

Ore deposits, origin. For ore deposits in general see Economic (general).**General.**

- Enrichment of ore deposits: Emmons, 324.
 Faulting and richness of ore: McLennan, 678; Soper, 970, 972; Storms, 1006.
 Magmatic segregation and ore genesis: Singewald, 951.
 Magmatic sulfides: Tolman, 1026.
 Asbestos, Black Lake-Thetford area, Quebec: Graham, 895.
 British Columbia, Rossland district: Bruce, 132.
 California, Engels: Graton and McLaughlin, 897; Tolman, 1024.
 Colorado, Central City quadrangle: Bastin and Hill, 58.
 Copper, Engels, California: Graton and McLaughlin, 897.
 North Carolina, Virgilina district: Laney, 608.
 sphalerite, relation to other sulphides in ores: Teas, 1017.
 Virginia, Virgilina district: Laney, 608.
 Warren district, Arizona: Bonillas et al., 92.
 Graphite, Quebec, Buckingham: Willson, 1152.
 Idaho, Coeur d'Alene district, Success zinc-lead deposit: Hershey, 458.
 Mackay region: Umpleby, 1054.
 Iron: Sosman, 973.
 Cuba, Firmeza district: Roessler, 871.
 manganiferous ores, Minnesota, Cuyuna district: Harder, 419.
 titaniferous magnetites, Minnesota: Broderick, 119.
 Lead and zinc, Ozark region: Buehler, 137.
 Montana, Boulder batholith: Billingsley and Grimes, 80.
 Nickel, Ontario, Sudbury deposits: Bateman, 54; Coleman, 220; Corless, 235; Dresser, 301; Tolman, 1025.
 Pyrite, Leona rhyolite: Clark, 197.
 Silver, Cobalt, Ontario: Bastin, 51.

Ore deposits, origin—Continued.

Silver ores, microscopic study: Guild, 409.

Tungsten deposits: Hess, 457.

Inyo County, California: Knopf, 592.

Zinc, Wisconsin: George, 370.

Zinc-lead deposit, Coeur d'Alene, Idaho: Umpleby, 1053.

Oregon.**Economic.**

Iron: Whittier, 1137.

Mineral production, 1916: Yale, 1183.

Dynamic and structural.

Glaciers, Mt. Jefferson: Hatch, 429.

Mount Hood, volcanic activity: Johnson, 524.

Stratigraphic.

Satsop formation: Bretz, 115.

Paleontology.

Corals: Nomland, 760.

Pliocene faunas: Merriam, 713.

Mineralogy.

Pricelte, Curry County: Larsen, 609.

Ore shoots. *See* Economic geology; Ore deposits, origin.

Orogeny.

Fan structure, Canadian Rocky Mountains: Keyes, 574.

New Mexico, Deming quadrangle: Darton, 257.

Oscillation. *See* Changes of level.

Ostracoda.

Silurian, Appalachian region: Ulrich, 1052.

Ookerite.

Texas, Thrall oil field: Schoch, 907.

Paleobotany.

Arkansas, Bingen sand: Berry, 69.

Atlantic Coastal Plain, Tertiary: Berry, 68.

Camptothesium, Kansan drift, Iowa: Grout, 408.

Carapa, Eocene: Berry, 70.

Florida, Vero, Pleistocene: Berry, 65, 77.

Fruit or nut, supposed, Tertiary, Alaska: Thomas, 1022.

Goniopteris claborniana, Eocene: Berry, 73.

Maine, Pleistocene plants, marine clays: Berry, 75.

Mississippi, Meridian: Berry, 72.

Pennsylvanian, Indiana: Jackson, 510.

Wyoming, Frontier formation: Knowlton, 595.

Paleoclimatology.

Lithologic evidence of climatic pulsations: Vail, 1058.

Martinez Eocene time, climatic zones: Dickerson, 280.

Oligocene, Washington: Dickerson, 279.

Paleogeography. *See also* Geologic history; Paleoclimatology; Paleogeographic maps.

Paleogeography—Continued.

Current ripples as indicators: Bucher, 135.

Geosyncline, western interior: Van Tuyl, 1061.

Montana, Cretaceous: Thom, 1020.

Panama straits, ancient: Dickerson, 281.

Tertiary: Vaughan, 1064.

Paleometeorology. *See* Paleoclimatology.

Paleontology (general). *See also the classes of animals and Paleobotany. For stratigraphic see the different systems. For regional see names of States. See also* Evolution.

Evolution, paleontological evidences: Scott, 916.

Evolution theory: Scott, 916.

Genetics: Gregory, 406.

Invertebrates, inorganic constituents: Clarke and Wheeler, 207.

Origin and evolution of life: Osborn, 768.

Rock-boring animals, geologic significance: Barrows, 46.

Paleozoic (undifferentiated).

Alaska, Kantishna region: Capps, 174.

Panama Canal Zone.

Dynamic and structural.

Earthquakes, Almirante, April, 1916: Reid, 846.

Slides: Branner, 111; Miller, 729.

Physiographic.

Ancient canals: Dickerson, 281.

Paleontology.

Echini: Jackson, 509.

Paragenesis of minerals.

British Columbia, Slovan district: Uglow, 1051.

North Carolina, Virgilina district: Laney, 608.

Replacement of sulphides by quartz: Wolcott, 1164.

Virginia, Virgilina district: Laney, 608.

Peat.

Minnesota: Soper, 971.

Nebraska: Barbour, 38.

Pebbles.

Intraformational, Richmond group: Foerste, 349.

Pelecypoda. *See also* Mollusca.

Jamaica, Bowden fauna: Woodring, 1170.

Nuculites, Silurian, Maine: Williams, 1143.

Penepains.

Age in Rocky Mountains: Atwood, 28; Blackwelder, 82.

Appalachian penepains, ages: Shaw, 929.

Kansas: Beede, 61.

Washington, Cascade: Smith, 969.

Pennsylvania.**Economic.**

Lehigh County: Miller, 723.

Pennsylvania—Continued.*Economic—Continued.*

Oil, black shales: Ashley, 26.

Petroleum: Fuller, 360.

Dynamic and structural.

Intraformational structure in Ordovician limestone: Field, 341.

Susquehanna River, erosion: Mathews, 694.

Physiographic.

Depos of Susquehanna River: Mathews, 694.

Lehigh County: Miller, 728.

Stratigraphic.

Boyertown Hills: Jonas, 537.

Cumberland-Lebanon Valley shales, age: Stose, 1007.

Devonian shales: Verwiebe, 1067.

Glaciation, first phase: Williams, 1142; Wright, 1178.

Helderberg limestone: Reeside, 841.

Lehigh County: Miller, 728.

Mississippian: Verwiebe, 1066.

Triassic, Piedmont Plateau: Jonas, 537.

Paleontology.

Calamopus paludosus (labyrinthodont), Triassic: Sinclair, 949.

Petrology.

Pre-Cambrian, eastern Pennsylvania: Wherry, 1115.

Pennsylvanian. *See* Carboniferous.

Pennsylvanian - Permian stratigraphic break: Lee, 624.

Pentremites. *See* Blastoides.Permian. *See* Carboniferous.**Petroleum.**

General: Arnold, 23, 24; Mayer, 708; Walker, 1081.

Accumulation: Daly, 250; Lauer, 621.

diastrophic theory: Daly, 249.

Anticlinal theory: White, 1133.

Oklahoma evidence on: Hager, 413.

Brines of oil fields, origin: Reeves, 842.

Capillarity, effect on oil accumulation: McCoy, 667.

Capillarity in oil accumulation: Washburne, 1099.

Diastrophic theory of oil and gas accumulation: Daly, 249.

Estimation of reserves: Pack, 773.

Ethics of petroleum geologist: Clapp,

Petroleum—Continued.*General—Continued.*

Petrology of reservoir rocks: Lauer, 621.

Practical value of oil and gas bureaus: Matteson, 699.

Prospecting: Allen, 14.

Rock pressure, cause: Shaw, 931.

Rôle of geology in discovery of: Ziegler, 1191.

Structural classification of petroleum fields: Clapp, 195.

Alberta: Slipper, 954.

Appalachian geosyncline, deep-sand possibilities, West Virginia: Reger, 844.

Appalachian oil field: Fuller, 360.

dry sands: Reeves, 843.

dryness of certain sands: Shaw, 933.

California: Pack, 774.

McKittrick district: Gester, 372.

Canada: Miller, 731.

Cuba, Bacuranao: Brödermann, 120.

Illinois: Kay, 548, 549.

Plymouth oil field: Blatchley, 86.

Indiana: Bownocker, 103.

Kansas: Gardner, 364.

Kentucky: Gardner, 365.

Irvine field: Shaw, 932.

Louisiana: Gardner, 364.

De Soto-Red River field: Matson and Hopkins, 696.

petroliferous mounds, origin: Chautard, 191.

Mexico: Day, 269; Wilson, 1151.

Isthmus of Tehuantepec: Hartley, 426.

Ohio: Bownocker, 103.

Cleveland: Van Horn, 1060.

Oil shale: Winchester, 1158.

Oklahoma: Gardner, 364; Hager, 414. Shannon *et al.*, 924.

Bristow quadrangle: Fath, 333.

Cushing field: Beal, 59; Conkling, 228.

Heraldton oil field: Powers, 815.

southern: Powers, 816.

Ontario: Miller, 731.

Petrolia field: Stansfield, 979.

Tennessee, Glenmary field: Purdue, 824.

Scott County, Glenmary: Glenn, 379.

Petroleum—Continued.

- Wyoming: Trumbull, 1035.
 Big Horn Basin: Hewett, 461.
 Byron field: Ziegler, 1189.
 Oregon Basin field: Ziegler, 1190.

Petrology (general). *See also* Igneous and volcanic rocks; Technique. *For regional see names of States. For rocks described, see list, p. 138.*

Abstracts and reviews: Johannsen, 527.

Analyses of igneous rocks: Washington, 1100.

Anorthosites: Bowen, 94.
 origin: Bowen, 95.

Average analyses in defining igneous rocks: Mathews, 693.

Baked shale and slag formed by burning of coal beds: Rogers, 874.

Common minerals and rocks: George, 371.

Microscope: Wright, 1175.

Mineragraphy, technique: Whitehead, 1134.

Phosphate.

General: Stone, 1001.

Alberta: Adams, 1; Adams and Dick, 6; De Schmid, 273.

Idaho: Bell, 62.

Kentucky, central: Phalen, 799.

Mexico, Monterey: Flores, 348.

Montana, Garrison-Phillipsburg fields: Pardee, 780.

United States: Mansfield, 685.

Western United States and Canada: Ferrier, 389.

Physiographic (general). *For regional see under the various States. See also Drainage changes.*

General: Baker, 84.

Appalachian penepains, ages: Shaw, 929.

Badlands: Marinelli, 687a.

Description of land forms: Jaeger, 513a.

Epicene profiles in desert lands: Keyes, 572.

Great Plains: Waldbaur, 1080a.

Rocky Mountains, age of penepains: Blackwelder, 82.

Step landscapes: Waldbaur, 1080a.

Terracing of bajada belts: Keyes, 569.

Topographic maps of United States: Davis, 264.

United States, physiographic divisions: Fenneman, 334, 335.

Pigeon Point, Minnesota: Daly, 251.

Pisces.

Bibliography: Dean and Eastman, 270.

Camposus and Edestus: Eastman, 316.

Collection of U. S. National Museum: Eastman, 315.

Ellesmere Land, Devonian fishes:

Kisar, 577.

Pisces—Continued.

Istiophorus calvertensis, Miocene, Virginia: Berry, 71.

Placera. *See* Gold.

Plagioclases, decimal grouping: Calkins, 157.

Plants, fossil. *See* Paleobotany.

Platinum.

General: Hill, 463.

Pleistocene. *See* Glacial geology; Quaternary.

Pliocene. *See* Tertiary.

Polyzoa. *See* Bryozoa.

Portland cement. *See* Cement.

Porto Rico.

Paleontology.

Mammalia: Anthony, 20, 21.

Potash.

General: Gale, 361; Phalen, 800.

Georgia, potash-bearing slates: McCally, 664.

Greensand deposits, eastern United States: Ashley, 27.

Pre-Cambrian.**Stratigraphy.**

General: Keyes, 567.

Correlation: Lane, 605.

Arizona, Warren district: Bonillas *et al.*, 92.

British Columbia, Kootenay region: Drysdale, 303.

California: Smith, 962.

Colorado, Central City quadrangle: Bastin and Hill, 53.

Gold Brick district: Crawford and Worcester, 238.

Kansas granite: Powers, 813.

Labrador, northeastern: Coleman, 219.

Manitoba, Schist Lake district: Bruce, 133.

southeastern: Dresser, 299; Wallace, 1083.

Wewusko Lake area: Bruce, 133.

Maryland, Tolchester quadrangle: Miller *et al.*, 730.

Massachusetts: Emerson, 321.

Minnesota, Cuyuna district: Harder, 419; Harder and Johnston, 420.

Mesabi Iron range: Wolff, 1166.

Missouri, Ozark region: Buehler, 137.

Montana, Garrison-Phillipsburg fields:

Pardee, 780.

New Mexico, Deming quadrangle: Darton, 257.

New York, Adirondack Mountains: Blue Mountain quadrangle: Miller, 733.

Edwards district: Newland, 753.

Ogdensburg region: Cushing, 245.

North Carolina, Kings Mountain district: Keith and Sterrett, 558.

Virginia district: Laney, 608.

Ontario, Boston Creek area: Burrows and Hopkins, 146.

Espanola district: Quirk, 827.

Goodfish Lake area: Burrows and Hopkins, 147.

Pre-Cambrian—Continued.

Stratigraphy—Continued.

Ontario, Boston Creek area—Continued.

Kowkash area: Hopkins, 490.

Lake Timiskaming: Hume, 503.

Onaping area: Collins, 224.

Pennsylvania, eastern: Jonas, 537.

Lehigh County: Miller, 728.

Quebec, Grenville district: Wilson, 1153, 1154.

Lake St. John basin: Dresser, 298.

Northern Transcontinental Railway, Hervey Junction-Doucet: Bancroft, 37.

Pontiac and Ottawa counties: Keele, 556.

Rhode Island: Emerson, 321.

Virginia, Virgilina district: Laney, 608.

Primates. *See* Mammalia.

Pseudomorphs.

Pectolite after quartz, Paterson, New Jersey: Glenn, 380.

Fumicite.

Nebraska: Barbour, 40.

Pyrite.

California, Leona rhyolite: Clark, 197.
New York, Edwards district: Newland, 753.

northern: Newland, 754.

Ontario, southeastern: Hopkins, 489, 491.

Quaternary. *See also* Glacial geology.

Stratigraphy.

Alaska, central, Quaternary history: Eakin, 309.

Tolovana district: Mertie, 720.

Arizona, Navajo country: Gregory, 402.

California: Smith, 962.

Florida, Vero: Berry, 77; Chamberlin, 186, 187; Hay, 436; Sellards, 922; Vaughan, 1063.

Kansas, Equus beds: Hay, 434.

Maryland, Tolchester quadrangle: Miller *et al.*, 730.

Mexico, Lower California: Helm, 448.

Nevada, Big Smoky Valley: Meinzer, 709.

New Jersey: Salisbury and Knapp, 890.

New Mexico, Deming quadrangle: Darton, 257.

Navajo country: Gregory, 402.

North Dakota: Leonard, 633.

Ontario, Espanola district: Quirke,

Quaternary—Continued.

Paleontology—Continued.

Florida, Vero: Sellards, 920.

Pleistocene, Plantæ: Berry, 65, 66.

Vertebrata: Hay, 435, 436.

Hawaii, Amastra: Cooke, 231.

Illinois, Sangamon peat, beetles: Wickham, 1140.

Iowa, Kansan drift, *Camptothecium*: Grout, 408.

Kansas, Equus beds: Hay, 434.

Mastodon: Hay, 437.

Maine, Pleistocene plants, marine clays: Berry, 75.

Waterville: Little, 643.

Nebraska, Cass County, *Dinartotherium*: Barbour, 39.

Tetralodon: Barbour, 41.

Pleistocene fauna, Oklahoma: Troxell, 1033.

Texas, Vertebrata: Hay, 432.

Yukon, Equus: Hay, 438.

Quebec.

General.

Northwestern Quebec: Cooke, 234.

Economic.

Buckingham area: Wilson, 1152.

Chromite: Dresser, 300.

Kaolin, Amherst Township, Labelle County: Wilson, 1154.

Limestones: Rouillard, 881.

Magnesite, Grenville district, Argenteuil County: Wilson, 1153-1155.

Mining operations, 1916: Denis, 272.

Molybdenite, Quyon: Camell, 168.

Northern Transcontinental Railway, Hervey Junction-Doucet: Bancroft, 37.

Pontiac and Ottawa counties: Keele, 556.

Road materials: Reinecke, 849, 850.

Soulanges and Vaudreuil counties: Picher, 805.

Two Mountains and Argenteuil counties: Gauthier, 308.

Serpentine and asbestos, origin, Black Lake-Thetford area: Graham, 395.

Thetford-Black Lake district (Colemain sheet): Knox, 596.

Stratigraphic.

Buckingham area: Wilson, 1152.

Grenville district, Argenteuil County: Wilson, 1153, 1154.

Quebec—Continued.**Petrology.**

Buckingham area: Wilson, 1152.

Quicksilver.

California, San Luis Obispo County: Logan, 646.

Texas: Phillips, 803.

Terlingua district: Udden, 1046.

Radioactivity.

Canada, mineral springs: Satterly and Elworthy, 891.

Meteorites: Quirk and Finkelstein, 829.

Radiolarite pebbles: Andr  e, 19.

Radium.

General: Hess, 455; Parsons, 785.

Rare earths.

Florida: Liddell, 637.

Rare metals.

General: McLeod, 679.

Replacement of sulphides by quartz: Wolcott, 1164.

Reptilia.

Barosaurus: Lull, 660.

Brachyceratops, Two Medicine formation, Montana: Gilmore, 378.

Camarasaurus: Osborn and Mook, 771.

Cheneosaurus, Cretaceous, Alberta: Lambe, 603.

Dinosaur tracks in Glen Rose limestone: Shuler, 944.

Dinosaurs, "sacral brain": Lull, 657.

Diplodocus, restoration: Hutchinson, 506.

Gorgosaurus, Cretaceous, Alberta: Lambe, 601.

Labidosaurus, Permian, Texas: Williston, 1147.

Monoclonius: Brown, 125.

Ogmodirus, Cretaceous, Kansas: Williston, 1149.

Ornitholestes: Osborn, 769.

Parelasaurus, Conemaugh series, West Virginia: Case, 176.

Phylogeny and classification: Williston, 1148.

Struthiomimus: Osborn, 769.

Tetrapoda, skull elements: Gregory, 404.

Miller, 784.

Tyrannosaurus: Osborn, 769.

Restorations.

Brachyceratops: Gilmore, 378.

Diatryma, Wyoming: Matthew, 706.

Diplodocus: Hutchinson, 506.

Labidosaurus: Williston, 1147.

Monoclonius: Brown, 125.

Plantae, Tertiary: Berry, 68.

Sidneyia inexpectans: Burling, 143.

Struthiomimus: Osborn, 769.

Triassic, Connecticut Valley: Lull, 656.

Rhode Island.**Stratigraphic.**

General: Emerson, 321.

Ripple marks.

General: Kindle, 580.

"Giant ripples," formation: Bucher, 134.

Richmond group: Foerste, 349.

Rivers.

Silting of Mississippi River: Atwood and Peattie, 30.

Road materials.

Ontario: Reinecke, 850.

Quebec: Reinecke, 849, 850.

Soulanges and Vaudreuil counties: Picher, 805.

Rock slides. *See* Landslides.

Rocks, structural features. *See also* Ripple marks.

Breccias, classification: Norton, 762.

Chert in Burlington limestone, origin: Tarr, 1015.

Current ripples: Bucher, 135.

Deformation of unconsolidated beds: Kindle, 581.

Friction and limiting strength of rocks: King, 582.

"Giant ripples," formation: Bucher, 134.

Internal friction during deformation: Adams and Bancroft, 5.

Plasticity: Adams and Bancroft, 5.

Veinlets in sedimentary rocks, origin: Taber, 1010.

Wave marks: Bucher, 135.

Rocks described. *See list, p. 153.*

Rocky Mountain region, middle Paleozoic stratigraphy: Tomlinson, 1027.

Rocky Mountains, age of peneplains: Atwood, 28.

Rubidium.

General: Browning, 129.

St. Peter sandstone, origin: Trowbridge, 1029.

Salt.

General: Stone, 1002.

Brines of oil fields, origin: Reeves, 842.

Coastal salt domes: Kennedy, 560.

Alberta, northern: Camell, 167.

Mexico: Zarate, 1186.

Lower California, Ojo de Liebre: Wittich, 1163.

Michigan, Detroit district: Sherzer, 937.

United States: Phalen, 801.

Salt domes, origin: Hopkins, 486; Shaw, 935.

Salvador.**Economic.**

San Sebastian mine: Wuensch, 1181.

Dynamic and structural.

Volcanic activity, recent: Wuensch, 1180.

Stratigraphic.

San Sebastian mine: Wuensch, 1181.

Sand. *See also* Glass sand; Silica.

General: Stone, 1004.

Canada: Cole, 216.

Sand—Continued.

Foundry molding sands : Cole, 215.
Sand dunes of Indiana : Bailey, 38.

Sandstone.

Canada : Cole, 216.
United States : Bowles, 102.

Santo Domingo.

Stratigraphic.

General : Maury, 707.

Paleontology.

General : Maury, 707.
Mollusca, Oligocene : Pillsbury and Johnson, 806.

Saskatchewan.

General.

Black Bay and Beaverlodge Lake areas : Alcock, 9.

Economic.

Coal : Dowling, 297.
Building and ornamental stones : Parks, 783.
Southeastern Saskatchewan : MacLean, 675.

Stratigraphic.

Black Bay and Beaverlodge Lake areas : Alcock, 9.
Southeastern Saskatchewan : MacLean, 675.

Satsop formation, Oregon and Washington : Bretz, 115.

Sedimentary rocks.

Sandstone : Vail, 1058.

Sedimentation. *See also* Conglomerates ; Erosion.

Bonneville Lake beds, origin : Keyes, 575.
California : Gilbert, 376.
Chemistry : Clarke and Wheeler, 207.
Deformation of unconsolidated beds : Kindle, 581.
Graptolite shales, shallow water deposits : Grabau and O'Connell, 394.
Salton Sea, California : Macdougall, 609.
Sifting of Mississippi River : Atwood and Peattie, 30.

Seismology. *See also* Earthquakes.

General : Klotz, 587.
Collection of earthquake data : Humphreys, 505.
Damping contrivance for seismographs : Lemos, 632.
Harvard seismographic report, 1915 : Woodworth, 1172.
Locating submarine faults : Klotz, 588.
Seismometric bookkeeping : Wood, 1169.
Velocity of *L* waves : Klotz, 586.

Selenium.

General : Hess, 456.

Serpentine.

Vermont : Jacobs, 513 ; Wigglesworth, 1141.

Shore lines. *See* Beaches ; Terraces.

Silica.

General : Katz, 545.
Deposition : Lindgren, 641.
Illinois, southern : Holbrook, 474.

Silurian.

General.

Comparison of European and American : Grabau, 391.

Ostracoda as guide fossils in Appalachian region : Ulrich, 1052.

Stratigraphy.

Alexandrian series, Illinois and Missouri : Savage, 892.
California : Smith, 962.
Iowa, Jones County, Cyathophyllum : Thomas, 1021.
Kentucky, Irvine field : Shaw, 932.
Massachusetts : Emerson, 321.
Michigan, Detroit district : Sherser, 937.
Montana, Garrison-Philipsburg fields : Pardee, 780.
New Mexico, Deming quadrangle : Darton, 257.
southern : Darton, 258.
Ohio : Foerste, 350.
Ontario, Lake Timiskaming : Hume, 503.
southwestern : Williams, 1145.
Pennsylvania, Lehigh County : Miller, 728.
Rocky Mountain region : Tomlinson, 1027.
Tennessee, Waynesboro quadrangle : Miser, 738.

Paleontology.

Alexandrian series, Illinois and Missouri : Savage, 892.
Maine, Nuculites : Williams, 1143.
Ohio : Foerste, 350.

Silver.

General : Lindgren, 640.
Enrichment of ore deposits : Emmons, 324.
Microscopic study of silver ores : Guild, 409.
Alaska : Brooks, 124.
Seward Peninsula : Mertie, 722.
Arizona : Helges, 446.
Patagonia district : Schrader, 908.
Santa Rita district : Schrader, 908.
British Columbia, Slocan district : Uglow, 1051.
Vancouver and adjacent islands : Brewer, 117.
California : Yale, 1183.
Colorado, Bonanza district : Patton, 787.
Central City quadrangle : Bastin and Hill, 53.
Gold Brick district : Crawford and Worcester, 238.
Eastern States : Hill, 465.
Idaho, Mackay region : Umpleby, 1054.
Mexico, Puebla : Honigsmann, 480.
Montana : Helges, 447.
Nevada, Wonder : Burgess, 140.

Silver—Continued.

- New Mexico: Henderson, 449.
 North America: Lindgren, 640.
 Ontario, Cobalt: Bastin, 51.
 Onaping area: Collins, 224.
 Oregon: Yale, 1188.
 South Dakota: Henderson, 450.
 Texas: Henderson, 449.
 United States, 1915: McCaskey, 666.
 Wyoming: Henderson, 450.

Slate.

- General: Loughlin, 650.

Slides. See Landslides.**Soapstone.**

- General: Diller, 289.

Soils.

- Illinois, Du Page County: Hopkins, 482.
 Edgar County: Hopkins, 481.
 Kane County: Hopkins, 483.
 Ontario, Ottawa area: Johnston, 534.
 Quebec, Ottawa area: Johnston, 534.

South Carolina.**Economic.**

- Tin, Kings Mountain district: Keith and Sterrett, 558.

Stratigraphic.

- Kings Mountain district: Keith and Sterrett, 558.

South Dakota.**General.**

- Black Hills region, bibliography: O'Harra, 763.
 State survey, work of: Ward, 1086.

Economic.

- Clay derived from volcanic dust, Pierre formation: Wherry, 1121.
 Lithium minerals: Schaller, 902.
 Mineral production, 1916: Henderson, 450.
 Tin: Bland, 85.
 Tungsten: Bland, 85.

Paleontology.

- Brachyura, Cretaceous: Rathbun, 831.

Petrology.

- Clay derived from volcanic dust, Pierre formation: Wherry, 1121.

Mineralogy.

- Calcite, lamellar, Keystone: Wherry, 1127.
 Rutile, black, and strueverite, identity: Headden, 443.

Stone.

- British Columbia: Parks, 782.

Stratigraphic (general). For regional see names of States. See also the different systems.**General.**

- Bryozoa, use in stratigraphy: Bassler, 49.
 Graptolite shales, shallow water deposits: Grabau and O'Connell, 394.
 St. Peter sandstone, origin: Trowbridge, 1029.

Stratigraphic (general)—Continued.**Correlation.**

- Carboniferous, eastern and western interior coal fields: Keyes, 576.
 Carrizo Creek coral-reef fauna, significance: Vaughan, 1065.
 Cretaceous formations, correlation: Hares, 424.
 Devonian shales, Ohio and Pennsylvania: Verwiebe, 1067.
 Helderberg limestone, Pennsylvania: Reeside, 841.
 Martinez formation: Waring, 1088.
 Mississippian, Ohio and Pennsylvania: Verwiebe, 1066.
 Montana group: Thom, 1020.
 Oklahoma, Pennsylvania: Bloesch, 88.
 Ordovician: Raymond, 833.
 Canada: Mather, 691.
 Pre-Cambrian: Keyes, 567; Lane, 605.
 Rocky Mountain region: Tomlinson, 1027.
 Tertiary-Cretaceous, southern California: Waring, 1088.
 Western phosphate field: Mansfield, 685.
 Wyoming: Trumbull, 1025.

Tables of formations.

- Alabama, Hatchetigbee anticline: Hopkins, 488.
 Alberta, southern: Dowling, 296.
 Arkansas, Caddo Gap and De Queen quadrangles: Miser, 737.
 British Columbia, Kootenay region: Drysdale, 303.
 Telkwa River district: Dolmage, 292.
 Vancouver Island, Sooke and Duncan areas: Clapp, 193.
 California: Smith, 962.
 Florida: Mansfield, 685.
 Georgia, Coastal Plain: Shearer, 936.
 Iowa: Keyes, 565.
 Kansas: Keyes, 564.
 Kentucky: Miller, 727.
 Labrador, northeastern: Coleman, 219.
 Louisiana: Matson, 695.
 Maine, southwestern: Katz, 546.
 Maryland, Tolchester quadrangle: Miller *et al.*, 730.
 Massachusetts: Emerson, 321.
 Michigan: Smith, 967.
 Missouri: Keyes, 562.
 Montana, Blackfeet Indian Reservation: Stebinger, 984.
 Bowdoin dome: Collier, 223.
 Bull Mountain coal field: Woolsey *et al.*, 1173.
 Navajo country: Gregory, 402.
 New Hampshire, southeastern: Katz, 546.
 New Mexico: Keyes, 563.
 North Dakota: Leonard, 633.
 Ohio, Cleveland gas field: Rogers, 875.
 southern: Stout, 1008.
 Ontario, Espanola district: Quirk, 827.

Stratigraphic—Continued.**Tables of formations—Continued.**

- Onaping area : Collins, 224.
 Ordovician, Canada : Mather, 691.
 Pre-Cambrian : Keyes, 567 ; Lane, 605.
 Quebec, Grenville district : Willson, 1154.
 Thetford-Black Lake district (Cole-raine sheet) : Knox, 596.
 Tennessee phosphate region : Mansfield, 685.
 Texas, Palestine salt dome : Hopkins, 486.
 Wyoming, Big Horn Basin : Hewett, 461.
 Byron field : Ziegler, 1189.
 Oregon Basin field : Ziegler, 1190.
 Yukon, Klotassin area : Cairnes, 154.

Strontium.

General : Hill, 466.

Structural materials. *See also* Building stone, Clay, etc.

California, Los Angeles, Orange, and Riverside counties : Merrill, 716.
 Mexico : Tello, 1019.

Study and teaching. *See* Educational.**Subsidence.** *See* Changes of level.**Subterranean water.** *See* Underground water.**Sulphur.**

Louisiana, Belle Isle : Lucas, 655.
 Maine, central, pyrrhotite : Bastin, 52.
 Texas, Culberson County : Phillips, 804.
 Rustler Springs : Porch, 811.
 United States : Pogue, 810.

Surveys.

General : Clark, 203.
 Historical : Clark, 203.
 Organization and cost : White, 1131.
 California, State Mineralogist, Report XIV : Hamilton, 416.
 Canada, report for 1916 : McInnes, 673.
 Connecticut, report of Survey, 1915-16 : Gregory, 401.
 Illinois, report State geologist, 1911-13 : DeWolf, 275.
 1913-15 : DeWolf, 276.
 Indiana : Blatchley, 87.
 Iowa, report of State geologist : Kay, 550.
 Maryland : Clark, 203.
 Minnesota, report for 1914-15 : Emmons, 323.
 Missouri, State geologist, biennial re-

Talc.

General : Diller, 289.
 Vermont : Jacobs, 513.

Tantalum.

General : James, 519.

Technique.

Developing crystallized mineral specimens : Hawkins, 430.
 Dip protractor : Wentworth, 1111.
 Microscopic, petrographic : Wright, 1175.
 Mineralogy : Whitehead, 1134.
 Mineral collection : Duce, 304.

Tellurium.

General : Hess, 456.

Tennessee.**General.**

Report of State geologist, 1916 : Purdue, 823.

Economic.

Coal, Pikeville quadrangle : Butts, 149.
 Gravels, west Tennessee valley : Wade, 1074.
 Oil, black shales : Ashley, 26.
 Oil and gas possibilities, Highland Rim : Purdue, 825.
 Petroleum : Fuller, 360.
 Glenmary, Scott County : Glenn, 379 ; Purdue, 824.

Physiographic.

Highland Rim : Purdue, 825.

Stratigraphic.

Devonian and black shale succession, western Tennessee : Dunbar, 306.

Glenmary oil field : Purdue, 824.

Highland Rim : Purdue, 825.

Holston marble formation, east Tennessee : Gordon, 389.

Ripley formation, McNairy County : Wade, 1072.

Scott County, Glenmary : Glenn, 379.

Tuscaloosa formation : Wade, 1073.

delta character : Berry, 67.

Waynesboro quadrangle : Miser, 738.

Paleontology.

Busyon cretaceum : Wade, 1075.

Gastropoda, Cretaceous : Wade, 1076.

McNairy County : Wade, 1071.

Ripley fauna, McNairy County : Wade, 1072.

Rensselaerina, Linden shale : Dunbar, 307.

Terraces. *See also* Beaches ; Shore lines.

Bedford, Kentucky : Knox, 590.

Tertiary—Continued.

Stratigraphy—Continued.

- Apalachicola fauna, Lower California : Arnold and Clark, 25.
 Arizona, Navajo country : Gregory, 402.
 Astoria series, Mount Diablo region, California : Clarke, 204.
 British Columbia, Rossland district : Bruce, 132.
 Telkwa River district : Dolmage, 292.
 Vancouver Island, Sooke and Duncan areas : Clapp, 193.
 Ymlr area, West Kootenay district : Drysdale, 302.
 California : Smith, 962.
 Coalinga region, Etchegoin Pliocene : Nomland, 757.
 McKittrick district : Gester, 372.
 Martinez formation : Waring, 1088.
 Marysville Buttes : Dickerson, 282.
 Pliocene : Nomland, 758.
 Santa Margarita beds : Nomland, 759.
 Coastal region, Gulf of Mexico : Kennedy, 560.
 Florida, Tallahassee region : Sellards, 919.
 Georgia, Coastal Plain : Shearer, 936.
 Illinois, southern : Shaw, 934.
 Louisiana : Matson, 695.
 De Soto-Red River field : Matson and Hopkins, 696.
 Martinez Eocene time, climatic zones : Dickerson, 280.
 Maryland, Tolchester quadrangle : Miller *et al.*, 780.
 Massachusetts : Emerson, 821.
 Mexico, Lower California : Heim, 448.
 Tuxpan : Dickerson, 284.
 Mississippi, Meridian : Berry, 72.
 Montana, Blackfeet Indian Reservation : Stebinger, 984.
 Bull Mountain coal field : Woolsey *et al.*, 1178.
 high gravels, age : Collier, 222.
 Murfreesboro, stage of Miocene, Atlantic Coastal Plain : Olsson, 764.
 Nevada, Big Smoky Valley : Meinzer, 709.
 New Mexico, Deming quadrangle : Darton, 257.
 Navajo country : Gregory, 402.
 North Carolina, Orange County, Pliocene : Smith, 964.
 North Dakota : Leonard, 633.
 Oklahoma, north central : Bloesch, 89.
 Panama straits, ancient : Dickerson, 281.
 Santo Domingo : Maury, 707.
 Texas, Corsicana field : Matson and Hopkins, 697.
 Palestine salt dome : Hopkins, 486.
 Washington, Cowlitz River, Oligocene : Dickerson, 279.
 White Bluffs region : Merriam and Buwalda, 714.

Tertiary—Continued.

Stratigraphy—Continued.

- Wyoming, Big Horn Basin : Hewett, 461.
 Powder River basin : Wegemann, 1109.
Paleontology.
 Apalachicola fauna, Lower California : Arnold and Clark, 25.
 Bryozoa, cheilostome : Canu and Bassler, 172.
 California, Martinez formation : Waring, 1088.
 Pliocene : Nomland, 758.
 crab : Rathbun, 832.
 Santa Margarita beds : Nomland, 759.
 Colorado, Florissant, beetles : Wickham, 1139.
 Florissant, Insecta : Cockerell, 212, 213.
 Dinosaur tracks in Glen Rose limestone : Shuler, 944.
 Jamaica, Bowden fauna, Pelecypoda : Woodring, 1170.
 Louisiana, Eocene, Goniopteris : Berry, 78.
 Marine faunas, Atlantic Coastal Plain, environment : Gardner, 366.
 Martinez fauna, California : Waring, 1088.
 Mexico, northeastern : Dickerson and Kew, 283.
 Tuxpan : Dickerson, 284.
 Mississippi, Eocene, Goniopteris : Berry, 78.
 Meridian : Berry, 72.
 Murfreesboro, stage of Miocene, Atlantic Coastal Plain : Olsson, 764.
 Nebraska, Meteoreodon : Barbour and Cook, 42.
 Poebrotherium, Oligocene : Troxell, 1034.
 Orthophragmina, Georgia and Florida : Cushman, 247.
 Pliocene faunas, western United States : Merriam, 713.
 Santo Domingo : Maury, 707.
 Oligocene, Mollusca : Pilsbry and Johnson, 806.
 Virginia, Istiophorus, Miocene : Berry, 71.
 Washington, Cowlitz River, Oligocene : Dickerson, 279.

Texas.

Economic.

- Brenham salt dome, Washington and Austin counties : Hopkins, 437.
 Clay, dolomitic : Ries, 863.
 Granites : Nash, 747.
 Humble oil field, Harris County : Deussen, 274.
 Mineral production, 1916 : Henderson, 449.
 Natural gas, Corsicana field : Matson and Hopkins, 697.
 Ozokerite, Thrall oil field : Schoch, 907.

Texas—Continued.**Economic—Continued.**

Palestine salt dome, Anderson County: Hopkins, 486.

Petroleum: Gardner, 364.

Corsicana field: Matson and Hopkins, 697.

Humble field: Deussen, 274.

Thrall field: Udden and Bybee, 1050.

Petroliferous mounds, origin: Chautard, 191.

Quicksilver: Phillips, 803.

Terlingua district: Udden, 1046.

Sulphur: Pogue, 810.

Culberson County: Phillips, 804.

Rustler Springs: Porch, 811.

Physiographic.

Coastal region: Kennedy, 560.

Stratigraphic.

Brenham salt dome, Washington and Austin counties: Hopkins, 487.

Coastal region: Kennedy, 560.

Corsicana oil field: Matson and Hopkins, 697.

Culberson County: Phillips, 804.

Glen Rose limestone: Shuler, 944.

Humble oil field, Harris County: Deussen, 274.

Palestine salt dome, Anderson County: Hopkins, 486.

Permian: Wrather, 1174.

Rustler Springs region: Porch, 811.

Terlingua district: Udden, 1046.

Thrall oil field: Udden and Bybee, 1050.

Paleontology.

Equus scotti, Rock Creek: Troxell, 1032.

Labidosaurus, Permian, Texas: Williston, 1147.

Polkilosakos, Carboniferous, Young County: Watson, 1102.

Richthofenia: Böse, 91.

Vertebrata: Hay, 432.

Mineralogy.

Barite from oil wells: Moore, 743.

Meteorites, Plainview: Merrill, 718.

Textbooks.

Building stones and clays: Richardson, 854.

Chemical tests for minerals: Burdick, 139.

Descriptive mineralogy: Bayley, 58.

Laboratory guide: Smith.

Mineralogy: Moses and Parsons, 744;

Tin—Continued.

North Carolina, Kings Mountain district: Keith and Sterrett, 558.

South Carolina, Gaffney: Keith and Sterrett, 558.

South Dakota: Bland, 85.

Titanium.

General: Hess, 455; Watson, 1106.

Tolovana district, Alaska: Mertie, 720.

Tongue, new stratigraphic term: Stephenson, 989.

Triassic.**Stratigraphy.**

Arizona, Navajo country: Gregory, 402.

British Columbia, Rossland district: Bruce, 132.

Ymir area, West Kootenay district: Drysdale, 302.

California: Smith, 982.

Colorado, northern: Ziegler, 1187.

Massachusetts: Emerson, 321.

Pennsylvania, eastern: Jonas, 537.

Lehigh county: Miller, 728.

New Mexico, Deming quadrangle: Darton, 257.

Navajo country: Gregory, 402.

Red beds: Case, 177.

age and origin, southeastern Wyoming: Knight, 589.

Virginia, Virgilina district: Laney, 608.

Paleontology.

Connecticut Valley: Lull, 656.

Pennsylvania, Bucks County, labyrinthodont: Sinclair, 949.

Wyoming, Big Horn Basin: Hewett, 461.

Trilobita.

Bibliography, Paleozoic: Vogdes, 1070.

Classification: Raymond, 835.

Lower Cambrian: Burling, 143.

Mount Whyte fauna: Walcott, 1080.

Trinidad.**Economic.**

Asphalt: Richardson, 857.

Paleontology.

Orbitoides: Douvillé, 295.

Tungsten.

General: Hess, 455, 457; Palache, 776.

Alaska, Fairbanks district: Mertie, 721.

Seward Peninsula: Mertie, 722.

California, Inyo County: Knopf, 592.

Colorado, Central City quadrangle:

Unconformities.

Colorado, northern, foothills structure: Ziegler, 1188.

Devonian, Ontario, glauconitic: Andrée, 19.

Prairie du Chien-St. Peter unconformity: Trowbridge, 1030.

Rocky Mountain region: Tomlinson, 1027.

Underground volatile agents, genetic classification: Daly, 252.

Underground water (general). *See also* Geysers; Mineral waters; Springs; Thermal waters. *For regional see names of States.*

General: Imbeaux, 507.

Brines of oil fields, origin: Reeves, 842.

Diffusion of sodium chloride in Appalachian oil-field waters: Richardson, 859.

Evaporation of water at depth by natural gases: Mills and Wells, 736.

Underground volatile agents: Daly, 252.

Uranium.

General: Hess, 455.

Colorado, Central City quadrangle: Bastin and Hill, 53.

Ungulata. *See* Mammalia.

Upper Silurian. *See* Silurian.

Utah.*Economic.*

Copper, Ophir district: Loughlin, 651.

Deep Creek district; Custer, 248; Reagan, 839.

Horn Silver vein, Beaver County: Rohlfing, 878.

Miller Hill, American Fork mining district: Ryan, 885.

Oil shale, Green River formation: Winchester, 1158.

Ophir district: Loughlin, 651.

Zinc, Ophir district: Loughlin, 651.

Dynamic and structural.

Bonneville Lake beds, origin: Keyes, 575.

Physiographic.

Lake Bonneville, orographic origin: Keyes, 573.

Stratigraphic.

American Fork mining district: Ryan, 885.

Deep Creek Reservation: Reagan, 838, 839.

Little Cottonwood district: Wells and Butler, 1110.

Navajo country: Gregory, 402.

Rocky Mountain region, Paleozoic: Tomlinson, 1027.

San Francisco Range, Beaver County: Rohlfing, 878.

Mineralogy.

Aurichalcite, Big Cottonwood Canyon: Ledoux, 622.

Clayton Peak: Field, 342.

Utah—Continued.*Mineralogy—Continued.*

Crandallite, Tintic district: Loughlin and Schaller, 652.

Ilsemanite, Ouray: Schaller, 900.

Magnesioludwigite, Big Cottonwood Canyon: Butler and Schaller, 148.

Ophir district: Loughlin, 651.

Tungstenite, Little Cottonwood Canyon: Kuhre, 599; Wells and Butler, 1110.

Vanadium.

General: Hess, 455.

Veinlets in sedimentary rocks, origin: Taber, 1010.

Veins.

Origin of chrysotile veins: Taber, 1012.

Verd antique.

Vermont: Jacobs, 513.

Vermont.*General.*

State geologist's report, 1915-16: Perkins, 793.

Economic.

Copper: Jacobs, 512.

Mineral resources: Perkins, 795.

Serpentine: Wigglesworth, 1141.

Talc and verd antique deposits: Jacobs, 513.

Dynamic and structural.

Pleistocene deformation near Rutland: Kelth, 557.

Physiographic.

Glaciation, Green Mountains: Goldthwait, 382.

Greensboro, Hardwick, and Woodbury: Jones, 538.

Postglacial marine waters: Fairchild, 327.

Stratigraphic.

Calais, East Montpelier, and Berlin: Richardson, 853.

Glaciation, Green Mountains: Goldthwait, 382.

Greensboro, Hardwick, and Woodbury: Jones, 538.

Western Vermont: Perkins, 794.

Paleontology.

Calais, East Montpelier, and Berlin: Richardson, 853.

Vertebrata (general). *See also* Amphibia; Aves; Mammalia; Pisces; Reptilia.

Florida, Vero, Pleistocene: Hay, 435, 436; Sellards, 921.

Kansas, Equus beds: Hay, 434.

Pleistocene: Hay, 433.

Texas: Hay, 432.

Virginia.*Economic.*

Clay, Piedmont province: Ries and Somers, 865.

Virgilina district: Laney, 608.

Zircon-bearing pegmatites: Watson, 1104.

Dynamic and structural.

Allanite, weathering of: Watson, 1105.

Virginia—Continued.**Stratigraphic.**

- Geologic map: Watson, 1108.
 Greensand deposits: Ashley, 27.
 Murfreesboro stage of east coast Mio-
 cene: Olsson, 764.
 Virgilina district: Laney, 608.

Paleontology.

- Istiophorus calvertensis, Miocene:
 Berry, 71.
 Vertebrata, Saltville Valley, Smyth
 County: Peterson, 798.

Petrology.

- Virgilina district: Laney, 608.
 Zircon-bearing pegmatites: Watson,
 1104.

Mineralogy.

- Allanite: Watson, 1105.
 Amelia County, pegmatites: Watson,
 1104.

Volcanic ash.

- Nebraska: Barbour, 40.

Volcanic rocks. See Igneous and volcanic rocks.**Volcanism.**

- Volcanic mechanism: Washington,
 1101.

Volcanoes.

- Hawaiian Islands, arrangement: Pow-
 ers, 814.
 Kilauea, Hawaii: Jaggard, 515.
 aa lava: Jaggard, 516.
 cyclical variation in eruption:
 Wood, 1167.
 relief model: Sayles, 897.
 Mauna Loa: Day, 267.
 eruption, 1916: Wood, 1168.
 lava flow, 1916: Jaggard, 514.
 Mount Hood, Oregon: Jillson, 524.
 Mount St. Helens, Washington: Jill-
 son, 524, 525.
 Salvador: Wuensch, 1180.

Volcanoes (extinct).

- Washington, Cascades: Geballe, 369.

Washington.**General.**

- Cascades: Geballe, 369.

Economic.

- Coal, Olympic fields: Reagan, 837.
 Iron: Whittier, 1137.
 Mineral deposits, northern Okanogan
 County: Handy, 418, Okano-
 gan County, northern: Handy,
 418.

Dynamic and structural.

- Mount St. Helens, eruptions: Jillson,
 524, 525.

Physiographic.

- Grand Coulee: Oestreich, 762a.
 High level terraces, Okanogan Valley:
 Keyes, 566.
 Skykomish Basin: Smith, 969.

Stratigraphic.

- Okanogan County, northern: Handy,
 418.
 Oligocene, Cowlitz River: Dickerson,
 279.
 Satsop formation: Bretz, 115.

Washington—Continued.**Stratigraphic—Continued.**

- White Bluffs region: Merriam and
 Buwalda, 714.

Paleontology.

- Oligocene, Cowlitz River: Dickerson,
 279.

Water, underground. See Underground water.**Weathering.**

- Algal erosion: Andrée, 19.
 Allanite: Watson, 1105.

Well records. See Borings.**West Indies (general). See also names of islands.****Stratigraphic.**

- General: Dickerson, 281.

West Virginia.**Economic.**

- Appalachian geosyncline, deep-sand oil
 and gas possibilities: Reger,
 844.

- Braxton and Clay counties: Hennen,
 451.

- Oil, black shales: Ashley, 26.
 Petroleum: Fuller, 360.

Physiographic.

- Braxton and Clay counties: Hennen,
 451.

Stratigraphic.

- Braxton and Clay counties: Hennen,
 451; Price, 820.

- Uffington shale: Price, 821, 822.

Paleontology.

- Braxton and Clay counties: Price, 820.
 Pareiasaurus, Conemaugh series: Case,
 176.

Wind work.

- General: Keyes, 570.
 Epicean profiles in desert lands: Keyes,
 572.
 Navajo country: Gregory, 402.
 Terracing of bajada belts: Keyes, 569.

Wisconsin.**General.**

- Measuring of postglacial time through
 sedimentation in lakes: Hotch-
 kiss, 495.

Economic.

- Zinc: George, 870.

Physiographic.

- Devils Lake: Trowbridge, 1081.
 Rock terraces in Driftless Area: Mar-
 tin, 688.

Stratigraphic.

- Devils Lake region: Trowbridge, 1081.
Mineralogy.
 Meteorite, Colby, Clark County: Ward,
 1087.

Wyoming.**General.**

- Black Hills region, bibliography:
 O'Harra, 768.

Economic.

- Bentonite, origin, Big Horn Basin:
 Hewett, 459.
 Big Horn Basin, anticlines: Hewett,
 461.

Wyoming—Continued.*Economic—Continued.*

Mineral production, 1916: Henderson, 450.

Natural gas, Byron field, Bighorn County: Ziegler, 1189.

Natural gas, Oregon Basin field, Park County: Ziegler, 1190.

Petroleum: Trumbull, 1035.

Byron field, Bighorn County: Ziegler, 1189.

Oregon Basin field, Park County: Ziegler, 1190.

Dynamic and structural.

Big Horn Basin, anticlines: Hewett, 461.

Bull Lake Creek rock slide, Wind River Mountains: Branson, 112.

Stratigraphic.

General: Trumbull, 1035.

Amsden formation: Branson and Greger, 114.

Big Horn Basin, anticlines: Hewett, 461.

Byron field, Bighorn County: Ziegler, 1189.

Cretaceous formations, correlation: Hares, 424.

Frontier formation, southwestern Wyoming: Knowlton, 595.

Oregon Basin field, Park County: Ziegler, 1190.

Powder River basin: Wegemann, 1109.

Red Beds, age and origin, southeastern Wyoming: Knight, 589.

Rocky Mountain region, Paleozoic: Tomlinson, 1027.

Paleontology.

Diatryma, Bighorn Basin: Matthew and Granger, 706.

Frontier formation, flora: Knowlton, 595.

Gastroliths, Cloverly formation, Bighorn Basin: Hares, 423.

Underground water.

Lodgepole Valley: Meinzer, 710.

Yellowstone National Park.*Dynamic and structural.*

Geysers: Chaix, 185a.

Physiographic.

General: Martonne, 688a.

Mineralogy.

Calcite in silicified wood: Wherry, 1118.

Yttrium.

General: Schaller, 905.

Yukon.*General.*

Muck beds, frozen, Klondike district: Tyrrell, 1045.

Economic.

Gold, Scroggie, Barker, Thistle, and Kirkman creeks: Cairnes, 153.

Klotassin area: Cairnes, 154.

Tungsten, Dublin Gulch: Cairnes, 154.

Windy Arm district: Cairnes, 154.

Stratigraphic.

Klotassin area: Cairnes, 154.

Scroggie, Barker, Thistle, and Kirkman creeks: Cairnes, 153.

Paleontology.

Equus, Pleistocene: Hay, 438.

Zinc.

General: Nason, 749; Siebenthal, 947.

Characteristics of zinc deposits: Nason, 748.

Enrichment of ore deposits: Emons, 324.

Alaska, Seward Peninsula: Mertie, 722.

Arizona: Helkes, 446.

Patagonia district: Schrader, 908.

Santa Rita district: Schrader, 908.

California: Yale, 1183.

Eastern States: Hill, 465.

Idaho, Coeur d'Alene, Success mine: Umpleby, 1058.

Missouri, Ozark region: Buehler, 137.

Montana: Helkes, 447.

Dunkleberg district: Pardee, 781.

New Mexico: Henderson, 449.

New York, Edwards district: Newland, 753.

Oklahoma, Miami district: Perry, 796.

Oregon: Yale, 1183.

Texas: Henderson, 449.

United States: Siebenthal, 945, 946.

Utah, Ophir district: Loughlin, 651.

Wisconsin: George, 370.

Zircon.

General: Schaller, 905.

Virginia: Watson, 1104.

Zonal growth in hematite: Sosman and Hostetter, 974.

LISTS.

(The numbers refer to entries in the bibliography.)

CHEMICAL ANALYSES.¹

- | | |
|--|--|
| <p> Albite, 1104.
 Alkali syenite, 53.
 Allanite, 1104, 1105.
 Amblygonite, 902.
 Amethyst, 1107.
 Amphibolite, 193, 787.
 Andesite, 80.
 Ankerite, 238, 439.
 Apatite, 1104.
 Aphrosiderite, 618.
 Aplite, 80, 224.
 Apoandesite, 321.
 Aporhyolite, 321.
 Argentite, 320.
 Arsenopyrite, 320.
 Artesian water, 152.
 Augite, 1098.
 Augite andesite, 80, 787.
 Aurichalcite, 622.
 Basalt, 251.
 Beryl, 1104.
 Biotite latite, 53.
 Bostonite, 53.
 Breithauptite, 320.
 Brine, 937.
 Calcite, 354, 439.
 Camptonite, 321.
 Cardinalose, 53.
 Caribose, 53.
 Chalcedony, 1129.
 Chalcocite, 320.
 Chalmersite, 530.
 Chert, 1015.
 Chloanthite, 320.
 Chromic iron ore, 287.
 Chromite, 287.
 Clay, 193, 865, 1008, 1121.
 Coal, 104, 152, 164, 398, 439, 471, 473, 681, 1008.
 Cobaltite, 320.
 Columbite, 1104.
 Corundum, 180.
 Crandallite, 652.
 Crestmoreite, 313.
 Cumberlandite, 321. </p> | <p> Dacite, 80.
 Delondrose, 53.
 Diabase, 224, 251, 321.
 Diabase pitchstone, 321.
 Diorite, 80, 321, 966.
 Eakleite, 616.
 Eldorose, 53.
 Erythrite, 320.
 Euxenite, 732.
 Feldspar, 313.
 Forsterite, 37.
 Gabbro, 53, 80, 119, 251, 321.
 Gabbro-diorite, 321.
 Galena, 320.
 Gehlenite, 205.
 Glaucodot, 320.
 Glauconite, 27.
 Gneiss, 133, 193, 321.
 Gouge, 618.
 Granite, 321.
 Granodiorite, 132, 193, 313, 321.
 Granular red rock, 251.
 Greensand, 27.
 Griffithite, 618.
 Halloysite, 619, 1059.
 Helvite, 1104.
 Hematite, 874.
 Hessose, 321.
 Holyokeite, 321.
 Hornblende andesite, 80.
 Hornblendeite, 53.
 Hydromagnesite, 1153.
 Ilsemanite, 900.
 Invertebrates, 207.
 Iron ore, 439, 784, 868, 1008, 1137.
 Iron ore, manganese, 419.
 Kaolin, 1154.
 Keratophyre, 321.
 Latite, 80, 787.
 Laurvikose, 53.
 Lepidolite, 902.
 Leverrierite, 620.
 Limestone, 193, 313, 503, 932, 967, 1008.
 Löllingite, 320.
 Lydite, 321. </p> |
|--|--|

¹ The analyses in entry no. 1100 of the bibliography have not been included in this list.

- Magnesite, 303, 1153.
 Magnetite, 119.
 Manganese material, 1130.
 Manganese ore, 737.
 Marble, 321.
 Marl, 154, 1072.
 Matildite, 320.
 Melillite, 205.
 Metargillite, 251.
 Meteorite, 718.
 Microblite, 1104.
 Mine water, 607.
 Minette, 321.
 Mirabilite, 790.
 Monazite, 903, 1104.
 Monzonite, 53, 132, 302.
 Natural gas, 461, 676, 697, 877, 1060.
 Niccolite, 320.
 Norite, 224.
 Northfieldite, 321.
 Oil, 954.
 Oil sand, 932.
 Okenite, 313.
 Olivine basalt, 224.
 Olivine diabase, 224.
 Palagonite, 321.
 Petroleum, 697, 932.
 Phosphate, 273, 685.
 Phosphate rock, 799.
 Phyllite, 321.
 Polybasite, 320.
 Pomerose, 53.
 Porphyritic red rock, 251.
 Porphyry, 92, 321.
 Prehnite, 313.
 Proustite, 320.
 Psilomelane, 737.
 Ptilolite, 598.
 Pulaskite, 132.
 Pumicite, 40.
 Pyrite ore, 753.
 Pyrolusite, 737.
 Pyroxenite, 80.
 Quartz-biotite schist, 53.
 Quartz diabase, 224.
 Quartz monzonite, 53, 80, 321.
 Quartz norite, 224.
 Quartz porphyry, 80.
 Quartzite, 321.
 Rammelsbergite, 320.
 Rhodochrosite, 1117.
 Rhodose, 321.
 Rhyolite, 80, 197, 321, 787.
 Riversidelite, 313.
 Rose quartz, 1107.
 Sandstone, 321.
 Schist, 321, 513.
 Scorodite, 320.
 Seleniferous sulphur, 127.
 Serpentine, 321, 1141.
 Shale, baked, 874.
 Shale, black, 26.
 Shoshonose, 53.
 Siderite, 1117.
 Sideroplesite, 439.
 Siliceous earth, 303.
 Silver, native, 320.
 Smaltite, 320.
 Spessartite, 1104.
 Spodumene, 902.
 Steatite, 321.
 Strueverite, 443.
 Sulphur deposits, 811.
 Syenite, 321.
 Symplectite, 320.
 Talc, 513.
 Thuringite, 618.
 Tinguaitite, 321.
 Tonallite, 321.
 Trachyte, 321.
 Triphyllite, 902.
 Tungstenite, 599, 1110.
 Volcanic ash, 40.
 Water, 471, 697, 858, 859, 877, 932, 937.
 Water, spring, 1015.
 Wehrlite, 321.
 Zinc-pyrite ore, 753.

MINERALS DESCRIBED.

- Albite, 608.
 Allanite, 1105.
 Allophane, 872.
 Amblygonite, 902.
 Amethyst, 1107.
 Andalusite, 593.
 Apatite, 355.
 Aphrosiderite, 618.
 Calaverite, 305.
 Calcite, 313, 354, 597, 608, 1127.
 Catoptrite, 356.
 Cerargyrite, 409.
 Chalcedony, 1129.
 Chalcocite, 320, 409, 608.
 Chalcopyrite, 409, 608.
 Chalmersite, 530.

Crandallite, 652.
 Crestmoreite, 313, 356.
 Cuprite, 608.
 Cuprotungstite, 457.
 Diasporite, 1128.
 Diopside, 313.
 Dioptase, 477.
 Dolomite, 477.
 Dürdenite, 614.
 Dyscrasite, 409.
 Eakleite, 618.
 Ectropite, 356.
 Embolite, 140.
 Epiboulangerite, 927.
 Epidote, 313, 608.
 Erythrite, 320.
 Euxenite, 782.
 Evansite, 872.
 Famatinite, 928.
 Feldspar, 313.
 Ferberite, 457.
 Ferritungstite, 457.
 Flokitz, 356.
 Franklinite, 802.
 Galena, 320, 409, 468.
 Garnet, 313, 684.
 Gehlenite, 205.
 Gilpinite, 617.
 Glauco-dot, 320.
 Gold, 468.
 Goyasite, 899.
 Graphite, 313.
 Greenockite, 872.
 Greenstone (Virgilina), 608.
 Griffithite, 618.
 Halloysite, 619, 872, 1059.
 Hamlinite, 899.
 Hematite, 872.
 Hübnerite, 457.
 Huntillite, 409.
 Hydrocuprite, 872.
 Hydroglobertite, 610.
 Hydromagnesite, 313.
 Hydrotrollite, 872.
 Hydrozincite, 651.
 Ilsemanite, 900.
 Iodobromite, 140.
 Iodyrite, 140.
 Klaprothite, 608.
 Labradorite, aventurine, 18.
 Lardite, 872.
 Laumontite, 313.
 Lechetellérine, 872.
 Lepidolite, 902.
 Leverrierite, 620.

Matildite, 320.
 Melanconite, 872.
 Mehlite, 205.
 Merrillite, 356, 1128.
 Minaasragrite, 901.
 Mirabilite, 607, 790.
 Monasite, 903.
 Monite, 872.
 Monticellite, 313.
 Myeline, 872.
 Niccolite, 320.
 Okenite, 318.
 Opal, 313, 872.
 Orthoclase, 608.
 Partschinite, 618.
 Penfieldite, 612.
 Petalite, 902.
 Phenacite, 477.
 Pitchblende, 872.
 Pitticite, 872.
 Plattnerite, 925.
 Polybasite, 320, 409.
 Prehnite, 313.
 Pricelte, 609.
 Proustite, 320, 409.
 Psilomelane, 872.
 Ptilolite, 598.
 Pyrargyrite, 409.
 Pyrite, 409, 478, 608.
 Pyrolusite, 872.
 Pyromorphite, 926.
 Quartz, 313, 608, 1107.
 Quercyte, 872.
 Rammelsbergite, 320.
 Raspite, 457.
 Rhodochrosite, 1117.
 Riversidelite, 313, 35.
 Rutile, black, 443.
 Scapolite, 313.
 Scheelite, 154, 457.
 Schirmerite, 409.
 Schungite, 872.
 Scorodite, 320.
 Sericite, 608.
 Shanyavskite, 872.
 Siderite, 1117.
 Silver, native, 320, 409, 468.
 Slate, 608.
 Smaltite, 320.
 Smithsonianite, 651.
 Spencerite, 356, 1082.
 Specularite, 872.
 Sphalerite, 313, 409.
 Spodumene, 902.
 Stephanite, 409.

Thorite, 903.
 Thuringite, 618.
 Titanite, 313.
 Tourmaline, 313, 896.
 Triphylite, 902.
 Tungstenite, 599, 1110.
 Tungstite, 457.
 Turgite, 872.
 Turquoise, 896.
 Uranopillite, 617.
 Uranothallite, 615.

Vesuvianite, 313.
 Waluewite, 313.
 Water (crystals), 171.
 Wilkeite, 313.
 Willemite, 477.
 Wolframite, 154, 457.
 Wollastonite, 313.
 Xanthochroite, 872.
 Zinnwaldite, 902.
 Zippelite, 617.
 Zircon, 313.

ROCKS DESCRIBED.

Amphibolite, 321, 787.
 Andesite, 257, 787.
 Andesite breccia, 787.
 Andesite porphyry, 238.
 Anorthosite, 693.
 Aplite, 321.
 Aporhyllite, 321.
 Argillite, 321.
 Arligites, 693.
 Arkose, 321.
 Augite andesite, 787.
 Augite camptonite, 132.
 Augite latite, 132.
 Augite porphyry, 132.
 Basalt, 257.
 Beerbachose, 321.
 Biotite andesite, 787.
 Biotite granite, 238.
 Biotite latite, 53.
 Biotite, syenite, 238.
 Bostonite, 53.
 Breccia, 596.
 Camptonite, 321.
 Conglomerate, 321.
 Cumberlandite, 321.
 Diabase, 224, 321, 537, 608.
 Diabase pitchstone, 321.
 Diorite, 238, 321, 537.
 Diorite porphyry, 132, 238.
 Dunite, 321, 693.
 Esserite, 321.
 Gabbro, 53, 321, 537, 596, 730.
 Gabbro-diorite, 321.
 Gneiss, 321, 537.
 Granite, 53, 132, 238, 321, 537, 596, 608, 730.
 Granite gneiss, 53, 321.
 Granite pegmatite, 53.
 Granite porphyry, 132, 238, 257.
 Granodiorite, 132, 321.
 Greenstone (Virgilina), 608.
 Harzburgite, 693.
 Hessose, 321.
 Holyokite, 321.

Kersantite, 132.
 Koswite, 693.
 Latite, 787.
 Lherzolite, 693.
 Lydite, 321.
 Marble, 321.
 Metagabbro, 730.
 Microgranite, 238.
 Minette, 132, 321.
 Monzonite, 53, 132, 302.
 Nordmarkite, 321.
 Norite, 224.
 Northfieldite, 321.
 Odinite, 321.
 Olivine diabase, 224.
 Palsanite, 321.
 Palagonite, 321.
 Pegmatite, 238.
 Phyllite, 321.
 Pulaskite, 132, 302.
 Pyroxene monzonite, 238.
 Pyroxenite, 596.
 Quartz basalt, 257.
 Quartz-biotite schist, 53.
 Quartz diabase, 224.
 Quartz diorite, 53, 238, 321.
 Quartz gneiss, 53.
 Quartz latite, 257.
 Quartz monzonite, 53, 238, 321.
 Quartz monzonite porphyry, 257.
 Quartz norite, 224.
 Quartz porphyry, 608.
 Quartzite, 321.
 Rhyolite, 238, 257, 321, 787.
 Rhyolite pitchstone, 787.
 Rhyolite porphyry, 238.
 Rhyolite tuff, 787.
 Sandstone, 321.
 Saxonite, 321.
 Schist, 321.
 Serpentine, 321, 730.
 Slate, 321, 608.
 Syenite, 321.
 Syenite porphyry, 53.

GEOLOGIC FORMATIONS DESCRIBED.

- Aaron slate, Ordovician (?), Virginia, North Carolina: Laney, 608.
- Abbeyville gabbro, Virginia, North Carolina: Laney, 608.
- Ablene limestone, Permian, Texas: Wrather, 1174.
- Admiralty till, Pleistocene, British Columbia: Clapp, 198.
- Agawa formation, pre-Cambrian, Minnesota: Broderick, 119.
- Akron dolomite, Silurian, Ontario: Chadwick, 188.
- Aldridge conglomerate, pre-Cambrian, British Columbia: Drysdale, 303.
- Alger stage, Silurian, Kentucky: Miller, 727.
- Allegheny formation, Pennsylvanian, Ohio: Stout, 1008.
- Allegheny series, Pennsylvanian, West Virginia: Hennen, 451.
- Allensville member, Mississippian, Ohio: Stout, 1008.
- Allensville substage, Mississippian, Kentucky: Miller.
- Allentown limestone, Cambrian, Pennsylvania: Miller, 727, 728.
- Allison formation, Cretaceous, British Columbia: Rose, 880.
- Alpena limestone, Devonian, Michigan: Smith, 967.
- Alta shale, Cambrian, Utah: Tomlinson, 1027.
- Alum Bluff formation, Miocene, Florida: Sellards, 919.
- Alum Bluff formation, Tertiary, Georgia: Shearer, 936.
- Ames limestone, Pennsylvanian, Ohio: Stout, 1008.
- Ames limestone and shale, Pennsylvanian, West Virginia: Hennen, 451.
- Amherst schist, Carboniferous, Massachusetts: Emerson, 321.
- Amsden formation, Carboniferous, Wyoming: Hewett and Lupton, 461.
- Amsterdam limestone, Ordovician, New York: Coryell, 237.
- Anastasia formation, Pleistocene, Florida: Chamberlin, 186.
- Anderdon limestone, Silurian, Michigan: Smith, 967.
- Annabelle shale, Pennsylvanian, West Virginia: Hennen, 451.
- Antrim shale, Mississippian, Michigan: Sherzer, 917.
- Anvil Rock substage, Pennsylvanian, Kentucky: Miller, 727.
- Apalachicola group, Tertiary, Georgia: Shearer, 936.
- Aqua formation, Tertiary (Eocene), Maryland: Miller *et al.*, 730.
- Arcturus limestone, Pennsylvanian, Nevada: Spencer, 975.
- Arkadelphia clay, Cretaceous, Louisiana: Matson and Hopkins, 696.
- Arkansas novaculite, Devonian, Arkansas: Miser, 737.
- Arkona beds, Devonian, Ontario: Grabau, 393.
- Arnheim substage, Ordovician, Kentucky: Miller, 727.
- Arnoldsburg sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Arundel formation, Cretaceous, Maryland: Miller *et al.*, 730.
- Aspermont dolomite, Permian, Texas: Wrather, 1174.
- Astoria series, Oligocene, California: Clarke, 204.
- Athabasca series, pre-Cambrian, Saskatchewan: Alcock, 9.
- Athens shale, Ordovician, Virginia and Tennessee: Raymond, 833.
- Atoka formation, Carboniferous, Arkansas: Miser, 737.
- Aurora sandstone, Mississippian, Ohio: Verwiebe, 1066.
- Austin chalk, Cretaceous, Texas: Hopkins, 486; Matson and Hopkins, 697; Udden and Bybee, 1050.
- Ayer granite, Carboniferous (or later), Massachusetts: Emerson, 321.
- Bad River limestone, Algonkian, Michigan: Smith, 967.
- Baltimore gneiss, pre-Cambrian, Maryland: Miller *et al.*, 730.
- Barnwell formation, Tertiary, Georgia: Shearer, 936.
- Bass Islands dolomite, Silurian, Michigan: Sherzer, 917.
- Bass Island series, Silurian, Michigan: Smith, 967.
- Bayport (Maxville) limestone, Mississippian, Michigan: Smith, 967.
- Bearpaw formation, Cretaceous, Montana: Thom, 1020.
- Bearpaw shale, Cretaceous, Alberta: Dowling, 296.
- Bearpaw shale, Cretaceous, Montana: Collier, 223; Hares, 424; Stebinger, 984; Woolsey *et al.*, 1173.
- Beattyville substage, Pennsylvanian, Kentucky: Miller, 727.
- Becket granite gneiss, Archean, Massachusetts: Emerson, 321.
- Becraft limestone, Devonian, Pennsylvania: Reeside, 841.
- Bedford formation, Mississippian, Ohio: Stout, 1008.
- Bedford shale, Devonian or Carbonaceous, Ohio: Rogers, 875.
- Bedford shales, Devonian, Ohio: Verwiebe, 1067.
- Bedford substage, Mississippian, Kentucky: Miller, 727.
- Beekmantown formation, Ordovician, Michigan: Smith, 967.
- Beekmantown limestone, Ordovician, Pennsylvania: Miller, 728.

- Beekmantown limestone, Ordovician, Vermont: Perkins, 794.
- Belchertown tonalite, Carboniferous, Massachusetts: Emerson, 321.
- Bellevue substage, Ordovician, Kentucky: Miller, 727.
- Bellingham conglomerate, Carboniferous, Massachusetts and Rhode Island: Emerson, 321.
- Bellowspipe limestone, Ordovician, Massachusetts: Emerson, 321.
- Belly River series, Cretaceous, Alberta: Dowling, 296.
- Bennett quartzite, pre-Cambrian, Quebec: Knox, 596.
- Benson conglomerate, Cretaceous, British Columbia: Clapp, 193.
- Benson formation, Ordovician, Kentucky: Raymond, 833.
- Benton formation, Cretaceous, British Columbia: Rose, 880.
- Benton formations, Cretaceous, Wyoming: Ziegler, 1189.
- Benton shale, Cretaceous, North Dakota: Leonard, 633.
- Berea formation, Mississippian, Ohio: Stout, 1008.
- Berea formation, Mississippian, Pennsylvania: Verwiebe, 1066.
- Berea sandstone, Mississippian, Michigan: Sherzer, 917.
- Berea sandstone, Mississippian, Ohio: Rogers, 875.
- Berea substage, Mississippian, Kentucky: Miller, 727.
- Berkshire schist, Ordovician, Massachusetts: Emerson, 321.
- Bernardston formation, Devonian, Massachusetts: Emerson, 321.
- Berne substage, Mississippian, Kentucky: Miller, 727.
- Berwick gneiss, pre-Carboniferous, Maine, New Hampshire: Katz, 546.
- Bessemer granite, pre-Cambrian, North and South Carolina: Keith and Sterrett, 558.
- Bethel substage, Mississippian, Kentucky: Miller, 727.
- Beverly syenite, Carboniferous, Massachusetts: Emerson, 321.
- Biddeford granite, post-Carboniferous, New Hampshire and Maine: Katz, 546.
- Bigby (?) limestone, Ordovician, Kentucky: Phalen, 799.
- Bigby substage, Ordovician, Kentucky: Miller, 727.
- Bigfork chert, Ordovician, Arkansas: Miser, 737.
- Bighorn dolomite, Ordovician, Wyoming and Montana: Tomlinson, 1027.
- Bingen sand, Cretaceous, Arkansas: Berry, 69.
- Birch Creek schist, pre-Ordovician, Alaska: Capps, 174.
- Birdsville stage, Mississippian, Kentucky: Miller, 727.
- Birmingham moraine, Quaternary, Michigan: Sherzer, 917.
- Birmingham shale, Pennsylvanian, West Virginia: Hennen, 451.
- Bisher member, Silurian, Ohio: Foerste, 350.
- Black Hand substage, Mississippian, Kentucky: Miller, 727.
- Black River formation, Ordovician, New York: Coryell, 237.
- Black River limestone, Ordovician, Vermont: Perkins, 794.
- Blairmore formation, Cretaceous, British Columbia: Rose, 880.
- Blakely sandstone, Ordovician, Arkansas: Miser, 737.
- Blaylock sandstone, Silurian, Arkansas: Miser, 737.
- Bliss sandstone, Cambrian, New Mexico: Darton, 257, 258.
- Blowout Mountain sandstone, Permian, Texas: Wrather, 1174.
- Blue Hill granite porphyry, Carboniferous, Massachusetts: Emerson, 321.
- "Bolton" gneiss, Carboniferous, Massachusetts: Emerson, 321.
- Bonanza latite, Colorado: Patton, 787.
- Bonne Terre dolomite, Cambrian, Missouri: Buehler, 137.
- Boone formation, Mississippian, Missouri: Buehler, 137.
- Bowden beds, Miocene, Mexico and Central America: Dickerson, 281.
- Boylston schist, Carboniferous, Massachusetts: Emerson, 321.
- Bradfordian series, Devonian, Pennsylvania: Verwiebe, 1067.
- Brantree slate, Cambrian, Massachusetts: Emerson, 321.
- Brandywine formation, Tertiary (Pliocene), Maryland: Miller *et al.*, 730.
- Brannon cherty member, Ordovician, Kentucky: Phalen, 799.
- Brassfield substage, Silurian, Kentucky: Miller, 727.
- Breathitt stage, Pennsylvanian, Kentucky: Miller, 727.
- Brecksville formation, Mississippian, Ohio: Verwiebe, 1066.
- Bridgeton formation, Quaternary, New Jersey: Salisbury and Knapp, 890.
- Brimfield schist, Carboniferous, Massachusetts: Emerson, 321.
- Broncho Mountain granite, Colorado: Crawford and Worcester, 238.
- Brookline conglomerate member, Carboniferous, Massachusetts: Emerson, 321.
- Brownstown sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Bruce conglomerate, pre-Cambrian, Ontario: Quirke, 827.
- Bruce limestone, pre-Cambrian, Ontario: Quirke, 827.
- Bruce series, pre-Cambrian, Ontario: Quirke, 827.
- Brunswick conglomerate, Triassic, Pennsylvania: Jonas, 537; Miller, 728.

- Brunswick shale**, Triassic, Pennsylvania : Jonas, 537 ; Miller, 728.
- Brush Creek limestone**, Pennsylvanian, Ohio : Stout, 1008.
- Brush Creek limestone and shale**, Pennsylvanian, West Virginia : Hennen, 451.
- Buckingham series**, pre-Cambrian, Quebec : Wilson, 1153, 1154.
- Buena Vista member**, Mississippian, Ohio : Stout, 1008.
- Buffalo cement bed**, Silurian, New York : Chadwick, 183.
- Buffalo granite**, Virginia : Laney, 608.
- Buffalo sandstone**, Pennsylvanian, West Virginia : Hennen, 451.
- Buffalo Hill sandstones**, Permian, Texas : Wrather, 1174.
- Bulkley intrusives**, Tertiary (?), British Columbia : Dolmage, 292.
- Bull Lake Creek formation**, Cambrian, Wyoming : Branson, 112.
- Bullwagon dolomite**, Permian, Texas : Wrather, 1174.
- Burgoon formation**, Mississippian, Pennsylvania : Verwiebe, 1066.
- Byer member**, Mississippian, Ohio : Stout, 1008.
- Byer substage**, Mississippian, Kentucky : Miller, 727.
- Calaveras formation**, Carboniferous, California : Moody, 742.
- Calvert formation**, Tertiary (Miocene), Maryland : Miller *et al.*, 730.
- Cambridge limestone**, Pennsylvanian, Ohio : Stout, 1008.
- Cambridge slate**, Carboniferous, Massachusetts : Emerson, 321.
- Camden chert**, Devonian, Tennessee : Dunbar, 306.
- Campbell Creek limestone**, Pennsylvanian, West Virginia : Hennen, 451.
- Camp Nelson substage**, Ordovician, Kentucky : Miller, 727.
- Canajoharie shale**, Ordovician, New York : Raymond, 833.
- Cantwell formation**, Tertiary, Alaska : Capps, 174.
- Cape Elizabeth formation**, Carboniferous, Maine : Katz, 546.
- Cape May formation**, Quaternary, New Jersey : Salisbury and Knapp, 890.
- Carbondale formation**, Pennsylvanian, Illinois : Brokaw, 121 ; Cady, 151 ; Hinds, 469, 470 ; St. Clair, 886.
- Carlile shale**, Cretaceous, Wyoming : Hares, 424.
- Carmelo series**, Cretaceous, California : Hawley, 431.
- Cassville plant shale**, Permo-Carboniferous, West Virginia : Hennen, 451.
- Castle formation**, Permian (?), Texas : Porch, 811.
- Catahoula sandstone**, Oligocene, Alabama : Hopkins, 488.
- Catahoula sandstone**, Oligocene, Louisiana : Matson, 695.
- Cathedral formation**, Cambrian, British Columbia : Walcott, 1078, 1079.
- Catskill**, Devonian, New York : Verwiebe, 1067.
- Cedar District formation**, Cretaceous, British Columbia : Clapp, 193.
- Cedar Grove (Upper) sandstone**, Pennsylvanian, West Virginia : Hennen, 451.
- Cedarville dolomite**, Silurian, Ohio : Foerste, 350.
- Cedarville sandstone**, Pennsylvanian, West Virginia : Hennen, 451.
- Chagrin shale**, Devonian, Ohio : Rogers, 875.
- Chagrin shales**, Devonian, Ohio : Verwiebe, 1067.
- Chainman shale**, Mississippian, Nevada : Spencer, 975.
- Chanute shale**, Pennsylvanian, Missouri : Hinds and Greene, 471.
- Chattahoochee formation**, Oligocene, Florida : Sellards, 919.
- Chattahoochee formation**, Tertiary, Georgia : Shearer, 936.
- Chattanooga shale**, Mississippian, Tennessee : Dunbar, 306.
- Chazy limestone**, Ordovician, Vermont : Perkins, 794.
- Cherokee shale**, Pennsylvanian, Missouri : Hinds and Greene, 471.
- Cherryvale shale**, Pennsylvanian, Missouri : Hinds and Greene, 471.
- Chesapeake group**, Tertiary (Miocene), Maryland : Miller *et al.*, 730.
- Cheshire quartzite**, Cambrian, Massachusetts : Emerson, 321.
- Chester amphibolite**, Ordovician, Massachusetts : Emerson, 321.
- Chester group**, Mississippian, Illinois : St. Clair, 886.
- Chico**, Cretaceous, California : Clark, 197.
- Chico formation**, Cretaceous, California : Waring, 1088.
- Chicopee shale**, Triassic, Massachusetts : Emerson, 321.
- Chinle formation**, Triassic, Arizona, Utah, and New Mexico : Gregory, 402.
- Choctawhatchee formation**, Miocene, Florida : Sellards, 919.

- Citronelle formation, Pliocene, Louisiana: Matson, 695.
- Claggett formation, Cretaceous, Montana: Thom, 1020.
- Claggett shale, Cretaceous, Montana: Collier, 223; Hares, 424.
- Claiborne beds, Tertiary, Georgia: Shearer, 936.
- Claiborne group, Eocene, Alabama: Hopkins, 488.
- Claiborne group, Eocene, Louisiana: Matson, 695.
- Clallam formation, Oligocene, Washington: Clarke, 204.
- Clarion member, Pennsylvanian, Ohio: Stout, 1008.
- Clarksburg limestone, Pennsylvanian, West Virginia: Hennen, 451.
- Clear Fork beds, Permian, Texas: Wrather, 1174.
- Clearwater formation, Cretaceous, Alberta: McLearn, 676.
- Cleveland shale, Devonian, Ohio: Rogers, 875.
- Cleveland shales, Devonian, Ohio: Verwiebe, 1067.
- "Clinton" formation, Silurian, Ohio: Rogers, 875.
- Clore formation, Mississippian, Illinois: St. Clair, 886.
- Clore substage, Mississippian, Kentucky: Miller, 727.
- Cloverly formation, Cretaceous, Wyoming: Ziegler, 1189, 1190.
- Cloverly formation, Cretaceous (?), Wyoming: Hewitt and Lupton, 461.
- Coalburg sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Coalburg (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Cobalt series, pre-Cambrian, Ontario: Collins, 224; Quirke, 827.
- Cockeysville marble, Cambrian (?), Maryland: Miller *et al.*, 730.
- Cody formation, Cretaceous, Wyoming: Ziegler, 1189.
- Cody shale, Cretaceous, Wyoming: Ziegler, 1190.
- Cody shale, Cretaceous (?), Wyoming: Hewitt and Lupton, 461.
- Coeymans limestone, Devonian, Pennsylvania: Reeside, 841.
- Coldwater shale, Mississippian, Michigan: Sherzer, 917.
- Coles Brook limestone, Archean, Massachusetts: Emerson, 321.
- Collier shale, Cambrian, Arkansas: Miser, 737.
- Collingwood formation, Ordovician, Ontario: Raymond, 833.
- Colorado group, Cretaceous, Alberta: Downing, 296.
- Colorado group, Cretaceous, Montana: Collier, 223.
- Colorado shale, Cretaceous, Montana: Hares, 424; Stebinger, 984.
- Colorado shale, Cretaceous, New Mexico: Darton, 257.
- Colquits gneiss, Jurassic, British Columbia: Clapp, 193.
- Columbia formation, Quaternary, New Jersey: Sallsbury and Knapp, 890.
- Columbia group, Quaternary (Pleistocene), Maryland: Miller *et al.*, 730.
- Columbia substage, Quaternary, Kentucky: Miller, 727.
- Columbus limestone, Devonian, Ohio: Rogers, 875.
- Columbus substage, Devonian, Kentucky: Miller, 727.
- Colwood sands and gravels, Pleistocene, British Columbia: Clapp, 193.
- Comanche series, Cretaceous, Texas: Matson and Hopkins, 697.
- Comanche series, Lower Cretaceous, Louisiana: Matson and Hopkins, 696.
- Comanche system, Wyoming: Ziegler, 1189.
- Comanche Peak, Cretaceous, Texas: Wrather, 1174.
- Conemaugh formation, Pennsylvanian, Ohio: Stout, 1008.
- Conemaugh series, Pennsylvanian, West Virginia: Hennen, 451.
- Conewango formation, Devonian, Pennsylvania: Verwiebe, 1067.
- Connellsville sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Conway schist, Silurian (?), Massachusetts: Emerson, 321.
- Conway schist, Triassic, Massachusetts: Emerson, 321.
- Coon Creek horizon, Cretaceous, Tennessee: Wade, 1072.
- Corbin substage, Pennsylvanian, Kentucky: Miller, 727.
- Corry sandstone, Mississippian, Pennsylvania: Verwiebe, 1066.
- Corryville substage, Ordovician, Kentucky: Miller, 727.
- Coys Hill granite, Carboniferous (or later), Massachusetts: Emerson, 321.
- Crab Orchard clay shale, Silurian, Ohio: Foerste, 350.
- Creston formation, pre-Cambrian, British Columbia: Drysdale, 308.
- Crowsnest volcanics, Cretaceous, British Columbia: Rose, 880.
- Crystal Mountain sandstone, Ordovician (?), Arkansas: Miser, 737.
- Curdsville formation, Ordovician, Kentucky: Raymond, 833.
- Curdsville substage, Ordovician, Kentucky: Miller, 727.
- Curlew substage, Pennsylvanian, Kentucky: Miller, 727.
- Cushing granodiorite, Carboniferous (?), Maine: Katz, 546.
- Cussewago sandstone, Mississippian, Pennsylvania: Verwiebe, 1066.
- Cussewago shale, Mississippian, Pennsylvania: Verwiebe, 1066.

- Cuyahoga formation, Mississippian, Ohio: Stout, 1008.
- Cuyahoga stage, Mississippian, Kentucky: Miller, 727.
- Cynthiana formation, Ordovician, Kentucky: Raymond, 833.
- Cynthiana stage, Ordovician, Kentucky: Miller, 727.
- Cypress formation, Mississippian, Illinois: St. Clair, 886.
- Cypress substage, Mississippian, Kentucky: Miller, 727.
- Cypress Creek chert, Devonian, Tennessee: Dunbar, 306.
- Dakota group, Cretaceous, Alberta: Dowl- ing, 296.
- Dakota sandstone, Cretaceous, New Mex- ico, Arizona, and Utah: Gregory, 402.
- Dakota sandstone, Cretaceous, North Da- kota: Leonard, 633.
- Dalton formation, Cambrian, Massachu- setts: Emerson, 321.
- Dana diorite, Carboniferous (or later), Massachusetts: Emerson, 321.
- Davis shale, Cambrian, Missouri: Buehler, 137.
- Dayton limestone, Silurian, Ohio: Foerste, 350.
- Decatur limestone, Devonian, Tennessee: Dunbar, 306.
- De Chelly sandstone, Carboniferous (Per- mian?), Arizona: Gregory, 402.
- Decorah shale, Ordovician, Minnesota: Ray- mond, 833.
- Decota sandstone, Pennsylvanian, West Vir- ginia: Hennen, 451.
- De Courcy formation, Cretaceous, British Columbia: Clapp, 193.
- Dedham granodiorite, Devonian (?), Massa- chusetts: Emerson, 321.
- Deerfield sheet, Triassic (or later), Massa- chusetts: Emerson, 321.
- Defiance moraine, Quaternary, Michigan: Sherzer, 917.
- Delaware formation, Permo-Carboniferous, Texas: Porch, 811.
- Delaware limestone, Devonian, Ohio: Rog- ers, 875.
- Delaware substage, Devonian, Kentucky: Miller, 727.
- Derby formation, Cambrian, Missouri: Buehler, 137.
- Detroit interlobate moraine, Quaternary, Michigan: Sherzer, 917.
- Detroit River dolomite, Silurian, Michigan: Sherzer, 917.
- Detroit River series, Silurian, Michigan: Smith, 967.
- Dewey limestone, Pennsylvanian, Okla- homa: Fath, 333.
- Dorchester slate member, Carboniferous, Massachusetts: Emerson, 321.
- Double Mountain beds, Permian, Texas: Wrather, 1174.
- Douglas formation, Pennsylvanian, Mis- souri and Kansas: Hinds and Greene, 471.
- Drum limestone, Pennsylvanian, Missouri: Hinds and Greene, 471.
- Dry Creek shale, Cambrian, Montana: Wal- cott, 1079.
- Duluth gabbro, pre-Cambrian, Minnesota: Broderick, 119.
- Duncan formation, Cretaceous, British Co- lumbia: Clapp, 193.
- Dundee limestone, Devonian, Michigan: Sherzer, 917.
- Dundee (Onondaga) limestone, Devonian, Michigan: Smith, 967.
- Dunderberg formation, Cambrian, Nevada: Walcott, 1078.
- Dunkard series, Permo-Carboniferous, West Virginia: Hennen, 451.
- Durbin formation, Silurian, Ohio: Foerste, 350.
- Eagle limestone and shale, Pennsylvanian, West Virginia: Hennen, 451.
- Eagle sandstone, Cretaceous, Montana: Col- lier, 223; Hares, 424; Thom, 1020.
- Eagle sandstone, Pennsylvanian, West Vir- ginia: Hennen, 451.
- Eagle Ford shale, Cretaceous, Texas: Hop- kins, 486; Matson and Hopkins, 697.
- Eagle Ford shales, Cretaceous, Texas: Ud- den and Bybee, 1050.
- Eagle Gulch latite, Colorado: Patton, 787.
- East Lynn sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- East Lynn (Upper) sandstone, Pennsylv- anian, West Virginia: Hennen, 451.
- Eden shale, Ordovician, Kentucky: Shaw, 932.
- Eldorado formation, Cambrian, Nevada: Walcott, 1078.
- Elgin sandstone, Pennsylvanian, Oklahoma: Fath, 333.
- Elliot slate, Carboniferous, Maine and New Hampshire: Katz, 546.
- Elk Basin sandstone member of Eagle sand- stone, Cretaceous, Wyoming: Hares, 424.
- Elk Lick limestone, Pennsylvanian, West Virginia: Hennen, 451.
- Ellis formation, Jurassic, Montana: Col- lier, 223; Pardee, 780.
- El Paso limestone, Ordovician, New Mex- ico: Darton, 257, 258.
- Ely greenstone, pre-Cambrian, Minnesota: Broderick, 119.
- Ely greenstones, pre-Cambrian, Ontario: Parsons, 784.

- Engadine dolomite, Silurian, Michigan: Smith, 967.
- Erving hornblende schist, Carboniferous, Massachusetts: Emerson, 321.
- Espanola gravel, pre-Cambrian, Ontario: Quirke, 827.
- Espanola greywacke, pre-Cambrian, Ontario: Quirke, 827.
- Espanola limestone, pre-Cambrian, Ontario: Quirke, 827.
- Estill substage, Silurian, Kentucky: Miller, 727.
- Etchegoin formation, Pliocene, California: Gester, 372; Nomland, 757, 759.
- Etchegoin group, Pliocene, California: Nomland, 758.
- Euphemia dolomite, Silurian, Ohio: Foerste, 350.
- Eureka quartzite, Ordovician, Nevada: Spencer, 975; Tomlinson, 1027.
- Eutaw formation, Cretaceous, Alabama and Tennessee: Berry, 67.
- Eutaw formation, Cretaceous, Georgia: Shearer, 936.
- Eutaw formation, Cretaceous, Kentucky: Wade, 1073.
- Eutaw formation, Cretaceous, Mississippi: Stephenson, 989.
- Ewing limestone, Pennsylvanian, West Virginia: Hennen, 451.
- Exeter diorite, post-Carboniferous, New Hampshire: Katz, 546.
- Extension formation, Cretaceous, British Columbia: Clapp, 193.
- Fairhaven member, Tertiary (Miocene), Maryland: Miller *et al.*, 730.
- Fairmount substage, Ordovician, Kentucky: Miller, 727.
- Fairview shale, Ordovician, Colorado: Crawford and Worcester, 238.
- Falkirk dolomite, Silurian, New York: Chadwick, 183.
- Falmouth pegmatite, Maine: Katz, 546.
- Farley limestone bed, Pennsylvanian, Kansas and Missouri: Hinds and Greene, 471.
- Farnham formation, Ordovician, Quebec: Knox, 596.
- Fayette sandstone, Eocene, Louisiana: Matson, 695.
- Ferne formation, Jurassic, British Columbia: Rose, 880.
- Fiborn limestone, Silurian, Michigan: Smith, 967.
- Fish Haven dolomite, Ordovician, Utah: Tomlinson, 1027.
- Fish Haven (Lower) dolomite, Ordovician, Utah: Tomlinson, 1027.
- Fitchburg granite, Carboniferous, Massa-
- Flathead quartzite, Cambrian, Montana: Pardee, 780.
- Flathead (?) sandstone, Cambrian, Montana: Walcott, 1079.
- Flaxville formation, Tertiary, Montana: Collier, 222.
- Foremost beds, Cretaceous, Alberta: Downing, 296.
- Fort Mountain formation, Cambrian, Alberta: Walcott, 1078.
- Fort Union formation, Eocene, North Dakota: Leonard, 633.
- Fort Union formation, Tertiary, Montana: Woolsey *et al.*, 1173.
- Fort Union formation, Tertiary, Wyoming: Ziegler, 1190.
- Fort Union formation, Tertiary (?), Wyoming: Hewett and Lupton, 461.
- Fort Union formation, Wyoming: Wegmann, 1109.
- Fox Hills sandstone, Cretaceous, North Dakota: Leonard, 633.
- Franciscan formation, California: Smith, 962.
- Franciscan group, California: Clark, 197.
- Franklin limestone, pre-Cambrian, Pennsylvania: Jonas, 537.
- Fredonia substage, Mississippian, Kentucky: Miller, 727.
- Freeport (Lower), Pennsylvanian, Ohio: Stout, 1008.
- Freeport (Lower) limestone, Pennsylvanian, West Virginia: Hennen, 451.
- Freeport (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Freeport (Upper) limestone, Pennsylvanian, West Virginia: Hennen, 451.
- Freeport (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Frontier formation, Cretaceous, Wyoming: Hares, 424; Knowlton, 595; Ziegler, 1189.
- Frontier formation, Cretaceous (?), Wyoming: Hewett and Lupton, 461.
- Frontier sandstones, Cretaceous, Wyoming: Ziegler, 1190.
- Fulton shale, Ordovician, Ohio: Raymond, 838.
- Fulton (Utica) substage, Ordovician, Kentucky: Miller, 727.
- Fusselman limestone, Silurian, New Mexico: Darton, 257, 258.
- Gabriola formation, Cretaceous, British Columbia: Clapp, 193.
- Gallatin formation, Cambrian, Wyoming: Tomlinson, 1027.
- Ganges formation, Cretaceous, British Columbia: Clapp, 193.

- Gilboy sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Girard shale, Devonian, Pennsylvania: Verwiebe, 1067.
- Glassboro phase, Quaternary, New Jersey: Salisbury and Knapp, 890.
- Glen Dean (Sloans Valley) substage, Mississippian, Kentucky: Miller, 727.
- Glendon limestone member, Oligocene, Alabama: Hopkins, 488.
- Glen Rose limestone, Texas: Shuler, 944.
- Glens Falls formation, Ordovician, New York: Raymond, 833.
- Gloucester formation, Ordovician, Ontario: Raymond, 833.
- Golconda formation, Mississippian, Illinois: St. Clair, 886.
- Golconda substage, Mississippian, Kentucky: Miller, 727.
- Gonic formation, Carboniferous, Maine and New Hampshire: Katz, 546.
- Goodridge formation, Pennsylvanian, Utah: Gregory, 402.
- Gordon formation, Cambrian, Montana: Walcott, 1079.
- Gordon shale, Cambrian, Montana: Walcott, 1078.
- Goshen schist, Ordovician (?), Virginia, North Carolina: Laney, 608.
- Goshen schist, Silurian (?), Massachusetts: Emerson, 321.
- Gosport sand, Eocene, Alabama: Hopkins, 488.
- Gowganda formation, pre-Cambrian, Ontario: Collins, 224; Quirke, 827.
- Grafton sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Granby tuff, Triassic, Massachusetts: Emerson, 321.
- Grand Falls chert, Mississippian, Missouri: Buehler, 137.
- Grand Rapids formation, Cretaceous, Alberta: McLearn, 676.
- Greendale substage, Ordovician, Kentucky: Miller, 727.
- Greer formation, Permian, Texas: Wrather, 1174.
- Grenville formation, pre-Cambrian, Quebec: Dresser, 298.
- Grenville series, pre-Cambrian, New York: Cushing, 245; Miller, 733; Newland, 753.
- Grenville series, pre-Cambrian, Quebec: Wilson, 1153, 1154.
- Greylock schist, Ordovician, Massachusetts: Emerson, 321.
- Grosse Isle moraine, Quaternary, Michigan: Sherzer, 917.
- Gulf series, Cretaceous, Texas: Matson and Hopkins, 697.
- Gulf series (Upper Cretaceous), Louisiana: Matson and Hopkins, 696.
- Hampden diabase, Triassic (or later), Massachusetts: Emerson, 321.
- Hardinsburg formation, Mississippian, Illinois: St. Clair, 886.
- Hardinsburg substage, Mississippian, Kentucky: Miller, 727.
- Hardwick granite, Carboniferous (or later), Massachusetts: Emerson, 321.
- Hardyston quartzite, Cambrian, Pennsylvania: Miller, 728.
- Harrodsburg substage, Mississippian, Kentucky: Miller, 727.
- Haslam formation, Cretaceous, British Columbia: Clapp, 193.
- Hasmark formation, Cambrian, Montana: Pardee, 780.
- Hatchetigbee formation, Eocene, Alabama: Hopkins, 488.
- Hattiesburg clay, Oligocene, Louisiana: Matson, 695.
- Hawley schist, Ordovician, Massachusetts: Emerson, 321.
- Haydens Peak latite, Colorado: Patton, 787.
- Hazleton group, Jurassic and Triassic, British Columbia: Dolmage, 292.
- Hecla sandstone, Pennsylvanian, Ohio: Stout, 1008.
- Helderberg limestone, Devonian, Pennsylvania: Reeside, 841.
- Hendricks series, Silurian, Michigan: Smith, 967.
- Henley member, Mississippian, Ohio: Stout, 1008.
- Henrietta formation, Pennsylvanian, Missouri: Hinds and Greene, 471.
- Hermitage formation, Ordovician, Kentucky: Raymond, 833.
- Hermitage formation, Ordovician, Tennessee: Raymond, 833.
- Hermitage substage, Ordovician, Kentucky: Miller, 727.
- Hennelton sandstone, Cambrian (Ozarkian), New York: Cushing, 245.
- Highbidge limestone, Ordovician, Kentucky: Shaw, 932.
- Highbidge stage, Ordovician, Kentucky: Miller, 727.
- Hinsdale gneiss, Archean, Massachusetts: Emerson, 321.
- Holtsclaw substage, Mississippian, Kentucky: Miller, 727.
- Holyoke diabase, Triassic (or later), Massachusetts: Emerson, 321.
- Homewood sandstone, Pennsylvanian, Ohio: Stout, 1008.
- Homewood sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Homewood substage, Pennsylvanian, Kentucky: Miller, 727.

- Hubbardston granite, Carboniferous, Massachusetts: Emerson, 321.
- Hull formation, Ordovician, Ontario: Raymond, 838.
- Huron shale, Devonian, Ohio: Rogers, 875.
- Huron shales, Devonian, Ohio: Verwiebe, 1087.
- Hyc quartz porphyry, Ordovician (?), Virginia, North Carolina: Laney, 608.
- Iatan limestone member, Pennsylvanian, Missouri and Kansas: Hinds and Greene, 471.
- Iatan (Kickapoo) limestone, Pennsylvanian, Kansas: Twenhofel, 1044.
- Idaho beds, Pliocene, Idaho: Merriam, 713.
- Idaho Springs formation, pre-Cambrian, Colorado: Bastin and Hill, 58.
- Ilo formation, Cretaceous, Wyoming: Ziegler, 1190.
- Indian Fields stage, Silurian, Kentucky: Miller, 727.
- Iola limestone, Pennsylvanian, Missouri: Hinds and Greene, 471.
- Iowan drift, Pleistocene, Iowa: Alden and Leighton, 10.
- Irasburg conglomerate, Ordovician, Vermont: Richardson, 853.
- Irene conglomerate, Cambrian, British Columbia: Drysdale, 808.
- Iron formation, pre-Cambrian, Ontario: Parsons, 784.
- Jackfork sandstone, Carboniferous, Arkansas: Miser, 737.
- Jackson formation, Eocene, Alabama: Hopkins, 488.
- Jackson formation, Eocene, Louisiana: Matson, 695.
- Jacksonburg limestone, Ordovician, Pennsylvania: Miller, 728.
- Jane Lew sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Jefferson dolomite, Devonian, Montana, Utah, and Wyoming: Tomlinson, 1027.
- Jefferson limestone, Devonian, Montana: Pardee, 780.
- Jefferson City dolomite, Ordovician, Missouri: Buehler, 137.
- Jeffersonville substage, Devonian, Kentucky: Miller, 727.
- Jelm formation, Triassic, Wyoming: Knight, 589.
- Jewell phyllite, Carboniferous, Maine: Katz, 546.
- Joana limestone, Mississippian, Nevada: Kaskaskia (Chester) series, Mississippian, Kentucky: Miller, 727.
- Kenwood substage, Mississippian, Kentucky: Miller, 727.
- Keokuk limestone, Mississippian, Illinois: Hinds, 469, 470.
- Keyser limestone member, Devonian, Pennsylvania: Reeside, 841.
- Kimmswick limestone, Ordovician, Illinois and Missouri: Raymond, 833.
- Kingsdown marls, Quaternary, Kansas: Hay, 434.
- Kittanning sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Kittery quartzite, Carboniferous, Maine and New Hampshire: Katz, 546.
- Knapp formation, Devonian, Pennsylvania: Verwiebe, 1087.
- Knife Lake formation, pre-Cambrian, Ontario: Parsons, 784.
- Knife Lake slates, pre-Cambrian, Minnesota: Broderick, 119.
- Knoxville formation, Cretaceous, California: Clark, 197.
- Kona dolomite, Algonkian, Michigan: Smith, 967.
- Kootenai formation, Cretaceous, Montana: Pardee, 780; Stebinger, 984.
- Kootenai (?) formation, Cretaceous, Montana: Collier, 223.
- Kootenay formation, Cretaceous, British Columbia: Rose, 880.
- La Biche formation, Cretaceous, Alberta: McLearn, 676.
- Lafayette substage, Pliocene, Kentucky: Miller, 727.
- LaGrange substage, Eocene, Kentucky: Miller, 727.
- Lake Louisa shale, Cambrian, Alberta: Walcott, 1078.
- Laketown dolomite, Silurian and Devonian, Utah: Tomlinson, 1027.
- Lake Trammel sandstone, Permian, Texas: Wrather, 1174.
- Lake Valley limestone, Mississippian, New Mexico: Darton, 257, 258.
- LaMotte sandstone, Cambrian, Missouri: Buehler, 137.
- Lance formation, Tertiary (?), Montana: Woolsey *et al.*, 1173.
- Lance formation, Tertiary (?), North Dakota: Leonard, 633.
- Lance formation, Tertiary (?), Wyoming: Hewett and Lupton, 461.
- Lance formation, Wyoming: Wegemann,

- Laurentian gneiss, pre-Cambrian, Quebec : Dresser, 298.
- Lawrence shale member, Pennsylvanian, Missouri and Kansas : Hinds and Greene, 471.
- Lawrence shales, Pennsylvanian, Kansas : Twenhofel, 1044.
- Leadville limestone, Devonian-Mississippian, Colorado : Crawford and Worcester, 238.
- Lebo shale member, Tertiary, Montana : Woolsey *et al.*, 1173.
- Lee quartz diorite, Archean, Massachusetts : Emerson, 321.
- Leech River formation, Carboniferous (?), British Columbia : Clapp, 193.
- Leigh formation, Ordovician, Utah : Tomlinson, 1027.
- Leithaville shaly limestone, Cambrian, Pennsylvania : Miller, 728.
- Lennep sandstone, Cretaceous, Montana : Thom, 1020.
- Leona rhyolite, Pliocene (?), California : Clark, 197.
- Le Roy shales, Pennsylvanian, Kansas : Twenhofel, 1044.
- Lewis shale, Cretaceous, Wyoming : Hares, 424.
- Lexington limestone, Ordovician, Kentucky : Shaw, 932.
- Lexington stage, Ordovician, Kentucky : Miller, 727.
- Leyden argillite, Silurian (?), Massachusetts : Emerson, 321.
- Liberty substage, Ordovician, Kentucky : Miller, 727.
- Lilley member, Silurian, Ohio : Foerste, 350.
- Linden shale and limestone, Devonian, Tennessee : Dunbar, 306.
- Lisbon formation, Eocene, Alabama : Hopkins, 488.
- L'Islet formation, Cambrian, Quebec : Knox, 596.
- Lobo formation, Triassic (?), New Mexico : Darton, 257.
- Logan formation, Mississippian, Ohio : Stout, 1008.
- Logan sills, pre-Cambrian, Minnesota : Broderick, 119.
- Long Lake series, Devonian, Michigan : Smith, 967.
- Longmeadow sandstone, Triassic, Massachusetts : Emerson, 321.
- Lorette formation, Ordovician, New York : McBean formation, Tertiary, Georgia : Shearer, 936.
- McElmo formation, Jurassic (?), New Mexico, Arizona, and Utah : Gregory, 402.
- Mackworth slate, Carboniferous, Maine : Katz, 546.
- McLeansboro formation, Pennsylvanian, Illinois : Cady, 151.
- McMurray formation, Cretaceous, Alberta : McLearn, 676.
- McNairy sand member, Cretaceous, Tennessee : Wade, 1072.
- Madison limestone, Carboniferous, Montana : Collier, 223.
- Madison limestone, Carboniferous, Wyoming : Hewett and Lupton, 461.
- Madison limestone, Mississippian, Montana : Pardee, 780.
- Madison limestone, Mississippian, Montana and Utah : Tomlinson, 1027.
- Magothy formation, Cretaceous, Maryland : Miller *et al.*, 730.
- Mahoning sandstone, Pennsylvania, Ohio : Stout, 1008.
- Mahoning (Middle) sandstone, Pennsylvanian, West Virginia : Hennen, 451.
- Mahoning (Lower) sandstone, Pennsylvanian, West Virginia : Hennen, 451.
- Mahoning (Upper) sandstone, Pennsylvanian, West Virginia : Hennen, 451.
- Malahat volcanics, Carboniferous (?), British Columbia : Clapp, 193.
- Mammoth Cave series, Mississippian, Kentucky : Miller, 727.
- Mancos shale, Cretaceous, New Mexico, Arizona, and Utah : Gregory, 402.
- Manigotagan granite, pre-Cambrian, Manitoba : Dresser, 298.
- Manistique series, Silurian, Michigan : Smith, 967.
- Mannington sandstone, Permo-Carboniferous, West Virginia : Hennen, 451.
- Marianna limestone, Oligocene, Alabama : Hopkins, 488.
- Marianna limestone, Tertiary, Florida : Cooke, 232.
- Mariposa formation, Jurassic, California : Moody, 742.
- Marlboro formation, Algonkian (?), Massachusetts and Rhode Island : Emerson, 321.
- Martinez formation, Tertiary, California : Waring, 1088.
- Martinsburg shale, Ordovician, Pennsyl-

- Maxville(?) limestone, Mississippian, Kentucky: Shaw, 932.
- Maysville formation, Ordovician, Kentucky: Shaw, 932.
- Maywood formation, Silurian(?), Montana: Pardee, 780.
- Mazarrn shale, Ordovician, Arkansas: Miser, 737.
- Meade gravels, Quaternary, Kansas: Hay, 434.
- Meadville formation, Mississippian, Pennsylvania: Verwiebe, 1066.
- Meagher limestone, Cambrian, Montana: Walcott, 1079.
- "Medina" shale, Silurian, Ohio: Rogers, 875.
- Meeteetse formation, Cretaceous, Wyoming: Hewett and Lupton, 461; Ziegler, 1190.
- Meeteetse member, Cretaceous, Wyoming: Ziegler, 1189.
- Menard formation, Mississippian, Illinois: St. Clair, 886.
- Menard substage, Mississippian, Kentucky: Miller, 727.
- Mercer (Lower) limestone, Pennsylvanian, Ohio: Stout, 1008.
- Mercer (Upper) limestone, Pennsylvanian, Ohio: Stout, 1008.
- Merkel dolomite, Permian, Texas: Wrather, 1174.
- Merrimack quartzite, Carboniferous, Massachusetts: Emerson, 321.
- Mesaverde formation, Cretaceous, New Mexico and Arizona: Gregory, 402.
- Mesaverde formation, Cretaceous, Wyoming: Hares, 424; Ziegler, 1189, 1190.
- Mesaverde formation, Cretaceous(?), Wyoming: Hewett and Lupton, 461.
- Metchozin volcanics, Eocene, British Columbia: Clapp, 193.
- Middlefield granite, Carboniferous (or later), Massachusetts: Emerson, 321.
- Midway formation, Eocene, Louisiana: Matson, 695.
- Midway formation, Eocene, Louisiana: Matson and Hopkins, 696.
- Midway formation, Tertiary, Georgia: Shearer, 936.
- Midway formation, Tertiary, Texas: Matson and Hopkins, 697.
- Midway formation, Tertiary (Eocene), Texas: Hopkins, 486.
- Milford granite, Devonian(?), Massachusetts: Emerson, 321.
- Milk River sandstone, Cretaceous, Alberta: Dowling, 296.
- Million substage, Ordovician, Kentucky: Miller, 727.
- Mississagi quartzite, pre-Cambrian, Ontario: Quirke, 827.
- Missouri Mountain slate, Silurian, Arkansas: Miser, 737.
- Moccasin limestone, Ordovician, Virginia: Raymond, 833.
- Moenkopi formation, Carboniferous (Permian?), Arizona and Utah: Gregory, 402.
- Monmouth formation, Cretaceous, Maryland: Miller *et al.*, 730.
- Monongahela series, Pennsylvanian, West Virginia: Hennen, 451.
- Monroe formation, Silurian, Ohio: Rogers, 875.
- Monroe group, Silurian, Michigan: Sherzer, 917.
- Monroe (Lower) series, Silurian, Michigan: Smith, 967.
- Monson granodiorite, Carboniferous (or later), Massachusetts: Emerson, 321.
- Montana group, Cretaceous, Montana: Stebinger, 984.
- Monterey formation, Miocene, California: Smith, 962.
- Monterey shale, Cretaceous, California: Hawley, 431.
- Montoya limestone, Ordovician, New Mexico: Darton, 257, 258.
- Mooreville tongue of Selma chalk, Cretaceous, Mississippi: Stephenson, 989.
- Morgantown sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Morrison formation, Cretaceous: Schuchert, 912.
- Morrison formation, Cretaceous, Colorado: Lee, 625.
- Morrison formation, Cretaceous, Wyoming: Ziegler, 1189, 1190.
- Morrison formation, Cretaceous(?), Wyoming: Hewett and Lupton, 461.
- Morse Creek limestone, Devonian, New York: Grabau, 393.
- Mount Auburn substage, Ordovician, Kentucky: Miller, 727.
- Mount Clemens moraine, Quaternary, Michigan: Sherzer, 917.
- Mount Hope substage, Ordovician, Kentucky: Miller, 727.
- Mount Roberts formation, Carboniferous, British Columbia: Bruce, 132.
- Mount Selman formation, Tertiary (Eocene), Texas: Hopkins, 486.
- Mount Toby conglomerate, Triassic, Massachusetts: Emerson, 321.
- Mount Whyte formation, Cambrian, British Columbia: Walcott, 1079.
- Mount Whyte formation, Cambrian, British Columbia and Alberta: Walcott, 1080.
- Mowry formation, Cretaceous, Wyoming: Ziegler, 1189.
- Mowry shale, Cretaceous, Montana: Coiller, 223.
- Mowry shale, Cretaceous, Wyoming: Hares, 424; Ziegler, 1190.
- Mowry shale, Cretaceous(?), Wyoming: Hewett and Lupton, 461.
- Murfreesboro stage, Miocene, Virginia and North Carolina: Olsson, 764.
- Nacatoch sand, Cretaceous, Louisiana: Matson and Hopkins, 696.
- Nanaimo series, Cretaceous, British Columbia: Clapp, 193.
- Navajo sandstone, Jurassic, New Mexico, Arizona, Utah: Gregory, 402.

- Navarro formation, Cretaceous, Texas: Hopkins, 486; Matson and Hopkins, 697.
- Nazareth cement limestone, Ordovician, Pennsylvania: Miller, 728.
- Nelson granodiorite, Jurassic, British Columbia: Bruce, 132.
- Nenana gravel, Tertiary (?), Alaska: Capps, 174.
- Nevada limestone, Devonian, Nevada: Spencer, 975.
- Newark group, Triassic, Massachusetts: Emerson, 321.
- Newark sandstone, Triassic, Virginia: Laney, 608.
- Newbury volcanic complex, Silurian or Devonian, Massachusetts: Emerson, 321.
- Newburyport quartz diorite, Devonian (?), Massachusetts: Emerson, 321.
- Newington moraine, Pleistocene, Maine, New Hampshire, and Massachusetts: Katz and Keith, 547.
- Newman series, Mississippian, Kentucky: Miller, 727.
- New Providence substage, Mississippian, Kentucky: Miller, 727.
- New Salem aplite, Carboniferous (or later), Massachusetts: Emerson, 321.
- New Scotland limestone, Devonian, Pennsylvania: Reeside, 841.
- Niagara limestone, Silurian, Michigan: Smith, 967.
- Niagara limestone, Silurian, Ohio: Rogers, 875.
- Niobrara formation, Cretaceous, North Dakota: Leonard, 638.
- Niobrara shale, Cretaceous, Wyoming: Hares, 424.
- Nisconlith series, pre-Cambrian, British Columbia: Drysdale, 303.
- Normanskill shale, Ordovician, New York: Raymond, 833.
- Northbridge granite gneiss, Archean, Massachusetts: Emerson, 321.
- Northumberland formation, Cretaceous, British Columbia: Clapp, 193.
- Oakland conglomerate, Cretaceous, California: Clark, 197.
- Oakdale quartzite, Carboniferous, Massachusetts: Emerson, 321.
- Oatka beds, Silurian, New York: Chadwick, 183.
- Ocala limestone, Eocene, Florida: Cooke, 232.
- Ocala limestone, Tertiary, Georgia: Ohio shale, Devonian, Ohio: Verwiebe, 1067.
- Ohio shale group, Devonian, Ohio: Rogers, 875.
- Ohio substage, Devonian, Kentucky: Miller, 727.
- Oktibbeha tongue of Selma chalk, Cretaceous, Mississippi: Stephenson, 989.
- Oldham substage, Silurian, Kentucky: Miller, 727.
- Olentangy shale, Devonian, Ohio: Grabau, 393; Verwiebe, 1067.
- Olentangy (?) shale, Devonian, Ohio: Rogers, 875.
- Olmstead shales, Devonian, Ohio: Verwiebe, 1067.
- Orangeville formation, Mississippian, Pennsylvania: Verwiebe, 1066.
- Oread limestone member, Pennsylvanian, Missouri and Kansas: Hinds and Greene, 471.
- Oregon substage, Ordovician, Kentucky: Miller, 727.
- Orlando limestone, Pennsylvanian, West Virginia: Hennen, 451.
- Osgood formation, Silurian, Ohio and Indiana: Foerste, 350.
- Osgood stage, Silurian, Kentucky: Miller, 727.
- Ottosee formation, Ordovician, Tennessee and Virginia: Raymond, 833.
- Owl Creek horizon, Cretaceous, Tennessee: Wade, 1072.
- Oxford schist, Carboniferous, Massachusetts: Emerson, 321.
- Pakowki shales, Cretaceous, Alberta: Dowlings, 296.
- Palestine formation, Mississippian, Illinois: St. Clair, 886.
- Palestine substage, Mississippian, Kentucky: Miller, 727.
- Pamunkey group, Tertiary (Eocene), Maryland: Miller *et al.*, 730.
- Park shale, Cambrian, Montana: Walcott, 1079.
- Parkman sandstone member of Claggett shale, Cretaceous, Wyoming: Hares, 424.
- Pascagoula clay, Miocene, Louisiana: Matson, 695.
- Paso Robles formation, California: Hawley, 431.
- Patapsco formation, Cretaceous, Maryland: Miller *et al.*, 730.
- Patuxent formation, Cretaceous, Maryland:

- Pend-d'Oreille group, post-Cambrian, British Columbia: Drysdale, 802.
- Pennington stage, Mississippian, Kentucky: Miller, 727.
- Pensaiken formation, Quaternary, New Jersey: Salisbury and Knapp, 890.
- Percha shale, Devonian, New Mexico: Darton, 257, 258.
- Perryville formation, Ordovician, Kentucky: Raymond, 833.
- Perryville substage, Ordovician, Kentucky: Miller, 727.
- Phosphoria formation, Permian (?), Montana: Pardee, 780.
- Picton formation, Ordovician, Ontario: Raymond, 833.
- Pierre shale, Cretaceous, North Dakota: Leonard, 633.
- Pilgrim limestone, Cambrian, Montana: Walcott, 1079.
- Pilot shale, Mississippian, Nevada: Spencer, 975.
- Pine Creek limestone, Pennsylvanian, West Virginia: Hennen, 451.
- Piscataway member, Tertiary (Eocene), Maryland: Miller *et al.*, 730.
- Pittsburgh red shale, Pennsylvanian, West Virginia: Hennen, 451.
- Pittsburgh (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Plattsburg limestone, Pennsylvanian, Kansas and Missouri: Hinds and Greene, 471.
- Pleasanton formation, Pennsylvanian, Missouri: Hinds and Greene, 471.
- Plum Creek shales, Devonian, Ohio: Grabau, 393.
- Plum Creek substage, Silurian, Kentucky: Miller, 727.
- Plum Point member, Tertiary (Miocene), Maryland: Miller *et al.*, 730.
- Pogonip limestone, Ordovician, Nevada: Spencer, 975.
- Point Pleasant substage, Ordovician, Kentucky: Miller, 727.
- Polk Creek shale, Ordovician, Arkansas: Miser, 737.
- Pondville conglomerate, Carboniferous, Massachusetts and Rhode Island: Emerson, 321.
- Porters Creek substage, Eocene, Kentucky: Miller, 727.
- Portsmouth member, Mississippian, Ohio: Stout, 1008.
- Potomac group, Cretaceous, Maryland: Miller *et al.*, 730.
- Potosi formation, Cambrian, Missouri: Buehler, 137.
- Potsdam sandstone, Cambrian, New York: Newland, 753.
- Potsdam sandstone, Cambrian (Ozarkian), New York: Cushing, 245.
- Pottsville formation, Pennsylvanian, Illinois: Cady, 151; Hinds, 469, 470; St. Clair, 886.
- Pottsville formation, Pennsylvanian, Kentucky: Shaw, 932.
- Pottsville formation, Pennsylvanian, Ohio: Stout, 1008.
- Pottsville series, Carboniferous, Illinois: Brokaw, 121.
- Pottsville series, Pennsylvanian, West Virginia: Hennen, 451.
- Prairie Bluff tongue of Selma chalk, Cretaceous, Mississippi: Stephenson, 989.
- Prairie du Chien formation, Ordovician, Wisconsin: Trowbridge, 1031.
- Prescott diorite, Carboniferous, Massachusetts: Emerson, 321.
- Priest River terrane, Beltian, British Columbia: Drysdale, 303.
- Prosser limestone, Ordovician, Minnesota: Raymond, 833.
- Protection formation, Cretaceous, British Columbia: Clapp, 193.
- Prout series, Devonian, Ohio: Grabau, 393.
- Ptarmigan formation, Cambrian, British Columbia: Walcott, 1078, 1079.
- Purcell series, pre-Cambrian, British Columbia: Drysdale, 303.
- Purgatory conglomerate, Carboniferous, Rhode Island: Emerson, 321.
- Puyallup clays, sands, and gravels, Pleistocene, British Columbia: Clapp, 193.
- Quabbin quartzite, Carboniferous, Massachusetts: Emerson, 321.
- Quadrant (?) quartzite, Pennsylvanian (?), Montana: Pardee, 780.
- Quartermaster formation, Permian, Texas: Wrather, 1174.
- Quincy granite, Carboniferous, Massachusetts: Emerson, 321.
- Raccoon substage, Mississippian, Kentucky: Miller, 727.
- Raisin River dolomite, Silurian, Michigan: Smith, 967.
- Randville dolomite, Algonkian, Michigan: Smith, 967.
- Raritan formation, Cretaceous, Maryland: Miller *et al.*, 730.
- Rattlesnake formation, Pliocene, Oregon: Merriam, 713.
- Red Bluff clay, Oligocene, Alabama: Hopkins, 488.
- Red Lion formation, Cambrian, Montana: Pardee, 780.
- Redoak granite, North Carolina: Laney, 608.
- Redstone limestone, Pennsylvanian, West Virginia: Hennen, 451.
- Renault formation, Mississippian, Illinois: St. Clair, 886.
- Rhode Island formation, Carboniferous, Massachusetts and Rhode Island: Emerson, 321.
- Ricardo formation, Pliocene, California: Merriam, 713.
- Rice Lake series, pre-Cambrian, Manitoba: Dresser, 299.
- Riceville shales, Devonian, Pennsylvania: Verwiebe, 1067.
- Richmond, Ordovician, Montana, Utah, and Wyoming: Tomlinson, 1027.

- Richmond formation, Ordovician, Kentucky: Shaw, 932.
- Ridgetop shale, Mississippian, Tennessee: Dunbar, 306.
- Rindgemere formation, Carboniferous, Maine and New Hampshire: Katz, 546.
- Ringold formation, Pleistocene, Washington: Merriam and Buwalda, 714.
- Ripley formation, Cretaceous, Georgia: Shearer, 936.
- Ripley formation, Cretaceous, Mississippi: Stephenson, 989.
- Ripley formation, Cretaceous, Tennessee: Wade, 1072.
- Ripley substage, Cretaceous, Kentucky: Miller, 727.
- Roan gneiss, Archean, North Carolina, South Carolina: Keith and Sterrett, 558.
- Roaring Creek sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Roberval formation, pre-Cambrian, Quebec: Dresser, 298.
- Rockcastle substage, Pennsylvanian, Kentucky: Miller, 727.
- Rockland formation, Ordovician, Ontario: Raymond, 833.
- Rosewood substage, Mississippian, Kentucky: Miller, 727.
- Rosiclar substage, Mississippian, Kentucky: Miller, 727.
- Ross Lake shale member, Cambrian, British Columbia: Walcott, 1078, 1079.
- Roubidoux formation, Cambrian, Missouri: Buehler, 137.
- Rove slate, pre-Cambrian, Minnesota: Broderick, 119.
- Rowe, schist, Ordovician, Massachusetts: Emerson, 321.
- Roxbury conglomerate, Carboniferous, Massachusetts: Emerson, 321.
- Royalton formation, Mississippian, Ohio: Verwiebe, 1066.
- Rustler formation, Permian (?), Texas: Porch, 811.
- Saanich granodiorite, Jurassic, British Columbia: Clapp, 193.
- Saddleback series, pre-Cambrian, British Columbia: Drysdale, 303.
- Saguenay formation, pre-Cambrian, Quebec: Dresser, 298.
- St. Genevieve, Mississippian, Illinois: St. Clair, 886.
- St. Genevieve stage, Mississippian, Kentucky: Miller, 727.
- St. Louis formation, Mississippian, Illinois: St. Clair, 886.
- St. Louis limestone, Mississippian, Illinois: Hinds, 469, 470.
- St. Mary River formation, Tertiary (?), Montana: Stebinger, 984.
- St. Mary's stage, Miocene, Maryland: Olson, 764.
- St. Maurice formation, Eocene, Louisiana: Matson, 695.
- St. Peter formation, Ordovician, Wisconsin: Trowbridge, 1031.
- St. Peter sandstone, Ordovician, Kentucky: Shaw, 932.
- St. Piran formation, Cambrian, British Columbia: Walcott, 1079.
- Salamanca conglomerate, Devonian, Pennsylvania: Verwiebe, 1067.
- Salem gabbro-diorite, Devonian (?), Massachusetts: Emerson, 321.
- Salina formation, Silurian, Michigan: Sherzer, 917.
- Salina formation, Silurian, Ohio: Rogers, 875.
- Salmon River monzonite stock, Tertiary, British Columbia: Drysdale, 302.
- Saltsburg sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Saluda substage, Ordovician, Kentucky: Miller, 727.
- Santa Lucia formation, California: Smith, 962.
- Santa Margarita (?) formation, California: Gester, 372.
- Santa Margarita formation, California: Hawley, 431.
- Santa Margarita formation, Miocene, California: Nomland, 759; Smith, 962.
- Sarten sandstone, Cretaceous, New Mexico: Darton, 257.
- Satsop formation, Quaternary, Oregon and Washington: Bretz, 115.
- Seunders formation, Algonkian, Michigan: Smith, 967.
- Savoy schist, Ordovician, Massachusetts: Emerson, 321.
- Sawatch quartzite, Cambrian, Colorado: Crawford and Worcester, 238.
- Scajaquada shales, Silurian, New York: Chadwick, 183.
- Scarboro phyllite, Carboniferous, Maine: Katz, 546.
- Schenectady formation, New York: Raymond, 833.
- Sciotoville member, Pennsylvanian, Ohio: Stout, 1008.
- Sellersburg substage, Devonian, Kentucky: Miller, 727.
- Selma chalk, Cretaceous, Mississippi: Stephenson, 989.
- Selma formation, Cretaceous, Alabama and Tennessee: Berry, 67.
- Serpent quartzite, pre-Cambrian, Ontario: Quirke, 827.
- Setters quartzite, Cambrian (?), Maryland: Miller *et al.*, 730.
- Sevier shale, Ordovician, Virginia: Raymond, 833.
- Sewickley limestone, Pennsylvanian, West Virginia: Hennen, 451.
- Sewickley (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Sewickley (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Shannon sandstone, Cretaceous, Wyoming: Hares, 424.
- Sharon conglomerate, Pennsylvanian, Ohio: Stout, 1008.

- Sharon conglomerate, Pennsylvanian, Pennsylvania: Verwiebe, 1066.
- Sharpville formation, Mississippian, Pennsylvania: Verwiebe, 1066.
- Shawangunk conglomerate, Silurian, Pennsylvania: Miller, 728.
- Shawnee formation, Pennsylvanian, Missouri: Hinds and Greene, 471.
- Shelburne Falls batholith, Carboniferous (or later), Massachusetts: Emerson, 321.
- Shenango sandstone, Mississippian, Pennsylvania: Verwiebe, 1066.
- Shenango shale, Mississippian, Pennsylvania: Verwiebe, 1066.
- Sheppard granite, Tertiary, British Columbia: Bruce, 132.
- Shinarump conglomerate, Triassic, Arizona and Utah: Gregory, 402.
- Shoshoni formation, Cambrian, Wyoming: Branson, 112.
- Sicker series, Jurassic, British Columbia: Cooke, 233.
- Sillery formation, Cambrian, Quebec: Knox, 596.
- Silver Hill formation, Cambrian, Montana: Pardee, 780.
- Silver Plume granite, pre-Cambrian, Colorado: Bastin and Hill, 53.
- Skeena formation, Cretaceous, British Columbia: Dolmage, 292.
- Sloane Valley formation, Mississippian, Illinois: St. Clair, 886.
- Smithfield limestone member, Algonkian (?), Massachusetts and Rhode Island: Emerson, 321.
- Snake River basalt, Tertiary, Idaho: Umpleby, 1054.
- Sobrante formation, Oligocene, California: Clarke, 204.
- Sooke formation, Miocene (?), British Columbia: Clapp, 193.
- Sooke intrusives, Oligocene, British Columbia: Clapp, 193.
- Sophie Mountain conglomerate, Tertiary, British Columbia: Bruce, 132.
- Soudan formation, pre-Cambrian, Minnesota: Broderick, 119.
- Springfield dolomite, Silurian, Ohio: Foerste, 350.
- Spring Point greenstone, Carboniferous, Maine: Katz, 546.
- Spurwink limestone, Carboniferous, Maine: Katz, 546.
- Squam granite, Carboniferous, Massachusetts: Emerson, 321.
- Squantum tillite member, Carboniferous, Massachusetts: Emerson, 321.
- Stamford granite gneiss, Archean, Massachusetts: Emerson, 321.
- Stanley shale, Carboniferous, Arkansas: Miser, 737.
- Stanton limestone, Pennsylvanian, Kansas and Missouri: Hinds and Greene, 471.
- Stanton limestones, Pennsylvanian, Kansas: Twenhofel, 1044.
- Steele shale, Cretaceous, Wyoming: Hares, 424.
- Sterling granite gneiss, Carboniferous (or later), Massachusetts: Emerson, 321.
- Stewartville dolomite, Ordovician, Minnesota: Raymond, 833.
- Stockbridge limestone, Cambrian and Ordovician, Massachusetts: Emerson, 321.
- Stones River formation, Ordovician, Tennessee and Virginia: Raymond, 833.
- Straw Hollow diorite, Carboniferous (or later), Massachusetts: Emerson, 321.
- Sugarloaf arkose, Triassic, Massachusetts: Emerson, 321.
- Summit series, Cambrian, British Columbia: Drysdale, 308.
- Summit series, Cambrian or pre-Cambrian, British Columbia: Drysdale, 302.
- Sunbury formation, Mississippian, Ohio: Stout, 1008.
- Sunbury shale, Mississippian, Ohio: Verwiebe, 1066.
- Sunbury shale, Mississippian, Pennsylvania: Verwiebe, 1066.
- Sunbury substage, Mississippian, Kentucky: Miller, 727.
- Sundance formation, Jurassic, Colorado: Lee, 625.
- Sundance formation, Jurassic, Wyoming: Hewett and Lupton, 461.
- Sunderland formation, Quaternary (Pleistocene), Maryland: Miller *et al.*, 730.
- Sutter formation, Tertiary, California: Dickerson, 282.
- Sutton formation, Jurassic and Triassic (?), British Columbia: Clapp, 193.
- Sutton limestone, Pennsylvanian, West Virginia: Hennen, 451.
- Swan Peak quartzite, Ordovician, Utah: Tomlinson, 1027.
- Sylvania sandstone, Silurian, Michigan: Sherzer, 917.
- Talbot formation, Quaternary (Pleistocene), Maryland: Miller *et al.*, 730.
- Talcott diabase, Triassic (or later), Massachusetts: Emerson, 321.
- Tallahatta buhrstone, Eocene, Alabama: Hopkins, 488.
- Tar Springs formation, Mississippian, Illinois: St. Clair, 886.
- Tar Springs substage, Mississippian, Kentucky: Miller, 727.
- Tatalina group, Cambrian or pre-Cambrian, Alaska: Mertie, 720.
- Tatalanika schist, Silurian or Devonian (?), Alaska: Capps, 174.
- Tatiana group, Ordovician (?), Alaska: Capps, 174.
- Taylor marl, Cretaceous, Texas: Matson and Hopkins, 697; Udden and Bybee, 1050.
- Tazin series, pre-Cambrian, Saskatchewan: Alcock, 9.
- Tejon formation, Tertiary, California: Waring, 1088.
- Tellico sandstone, Ordovician, Virginia: Raymond, 833.
- Tembler sandstone, Cretaceous, California: Hawley, 431.

- Pensleep sandstone, Carboniferous, Wyoming: Hewett and Lupton, 461.
 Theresa formation, Cambrian (Ozarkian), New York: Cushing, 245.
 Thermopolls shale, Cretaceous, Wyoming: Hares, 424; Ziegler, 1189, 1190.
 Thermopolls shale, Cretaceous (?), Wyoming: Hewett and Lupton, 461.
 Thousand Creek formation, Pliocene, Nevada: Merriam, 713.
 Three Forks formation, Devonian, Montana and Utah: Tomlinson, 1027.
 Thunder Bay series, Devonian, Michigan: Smith, 967.
 Tiger Creek sandstone, Pennsylvanian, Oklahoma: Fath, 333.
 Tionesta sandstone, Pennsylvanian, Ohio: Stout, 1008.
 Todilto formation, Jurassic, New Mexico and Arizona: Gregory, 402.
 Tobachi shale, Tertiary, New Mexico and Arizona: Gregory, 402.
 Tombigbee sand member, Cretaceous, Alabama and Tennessee: Berry, 67.
 Tonoloway limestone, Devonian, Pennsylvania: Reeside, 841.
 Tonzona group, Devonian, Alaska: Mertie, 720.
 Tonzona group, Silurian or Devonian (?), Alaska: Capps, 174.
 Towow formation, Carboniferous, Maine and New Hampshire: Katz, 546.
 Three Forks formation, Devonian, Montana and Utah: Tomlinson, 1027.
 Traverse formation, Devonian, Michigan: Sherzer, 917; Smith, 967.
 Trenton, Ordovician, Montana, Utah, and Wyoming: Tomlinson, 1027.
 Trenton formation, Ordovician, New York and Ontario: Raymond, 833.
 Trenton limestone, Ordovician, Michigan: Smith, 967.
 Trenton limestone, Ordovician, New York: Coryell, 237.
 Trenton limestone, Ordovician, Vermont: Perkins, 794.
 Tribes Hill formation, Ordovician, New York: Cushing, 245.
 Trinity sand, Triassic, Texas: Wrather, 1174.
 Tulare formation, Pleistocene, California: Gester, 372.
 Tupelo tongue of Coffee sand member, Cretaceous, Mississippi: Stephenson, 987.
 Tuscaloosa formation, Cretaceous, Alabama: Tyrone substage, Ordovician, Kentucky: Miller, 727.
 Unington shale, Pennsylvanian, West Virginia: Hennen, 451; Price, 821, 822.
 Uniontown limestone, Pennsylvanian, West Virginia: Hennen, 451.
 Uniontown sandstone, Pennsylvanian, West Virginia: Hennen, 451.
 Utica shale, Ordovician, New York: Raymond, 833.
 Utica shale, Ordovician, Vermont: Perkins, 794.
 Vancouver group, Triassic and Jurassic, British Columbia: Clapp, 193.
 Vancouver volcanics, Jurassic and Triassic (?), British Columbia: Clapp, 193.
 Vaqueros formation, Miocene, California: Smith, 962.
 Vashon drift, Pleistocene, British Columbia: Clapp, 193.
 Venango shale, Devonian, Pennsylvania: Verwiebe, 1067.
 Vergennes sandstone member, Pennsylvanian, Illinois: Cady, 151.
 Vicksburg formation, Tertiary, Georgia: Shearer, 936.
 Vicksburg group, Oligocene, Alabama: Hopkins, 488.
 Vicksburg limestone, Oligocene, Louisiana: Matson, 695.
 Villas shale, Pennsylvanian, Kansas and Missouri: Hinds and Greene, 471.
 Vinton member, Mississippian, Ohio: Stout, 1008.
 Vinton substage, Mississippian, Kentucky: Miller, 727.
 Virgelle sandstone, Cretaceous, Montana: Stebinger, 984.
 Virgillina greenstone, Ordovician, Virginia and North Carolina: Laney, 608.
 Waco substage, Silurian, Kentucky: Miller, 727.
 Walts River limestone, Ordovician, Vermont: Richardson, 853.
 Waldron substage, Silurian, Kentucky: Miller, 727.
 Wamsutta formation, Carboniferous, Massachusetts and Rhode Island: Emerson, 321.
 Wanakah shales, Devonian, New York: Grabau, 393.
 Wanipigow series, pre-Cambrian, Manitoba: Dresser, 299.
 Wark gneiss, Jurassic, British Columbia:

- Westboro quartzite, Algonkian (?), Massachusetts and Rhode Island: Emerson, 321.
- Westbrook granite, Maine: Katz, 546.
- Westerly granite, Carboniferous (or later), Massachusetts: Emerson, 321.
- Weston sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Weston shale, Pennsylvanian, West Virginia: Hennen, 451.
- Weston shale member, Pennsylvanian, Missouri and Kansas: Hinds and Greene, 471.
- West Union formation, Silurian, Ohio: Foerste, 350.
- Weymouth form, Cambrian, Massachusetts: Emerson, 321.
- White River formation, Oligocene, North Dakota: Leonard, 633.
- Whiteside granite, late Paleozoic, North and South Carolina: Keith and Sterrett, 558.
- Wichita beds, Permian, Texas: Wrather, 1174.
- Wilcomico formation, Quaternary (Pleistocene), Maryland: Miller *et al.*, 730.
- Willcox group, Eocene, Alabama: Hopkins, 488.
- Willcox formation, Eocene, Louisiana: Matson, 695; Matson and Hopkins, 696.
- Willcox formation, Tertiary, Georgia: Shearer, 936.
- Willcox formation, Tertiary (Eocene), Texas: Hopkins, 486.
- Williamsburg granodiorite, Carboniferous (or later), Massachusetts: Emerson, 321.
- Willow Creek formation, Tertiary (?), Montana: Stebinger, 984.
- Willmore formation, Ordovician, Kentucky: Raymond, 833.
- Willmore limestone, Ordovician, Kentucky: Phalen, 799.
- Willmore substage, Ordovician, Kentucky: Miller, 727.
- Winchester limestone, Ordovician, Kentucky: Shaw, 932.
- Wingate sandstone, Jurassic, New Mexico: Arizona: Gregory, 402.
- Winifrede limestone, Pennsylvanian, West Virginia: Hennen, 451.
- Winifrede (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Winifrede (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 451.
- Wissahickon mica gneiss, pre-Cambrian, Maryland: Miller *et al.*, 730.
- Wolfpen tonalite, Devonian (?), Massachusetts: Emerson, 321.
- Womble shale, Ordovician, Arkansas: Miser, 737.
- Woodbine sand, Cretaceous, Texas: Hopkins, 486; Matson and Hopkins, 697.
- Woodburn phosphatic member, Ordovician, Kentucky: Phalen, 799.
- Woodmansie phase, Quaternary, New Jersey: Salisbury and Knapp, 890.
- Worcester phyllite, Carboniferous, Massachusetts: Emerson, 321.
- Yagua formation, Eocene, Louisiana: Matson, 695.
- Yogo limestone, Cambrian, Montana: Wootton, 1079.
- Yule limestone, Ordovician, Colorado: Crawford and Worcester, 238.

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BIBLIOGRAPHY
OF
NORTH AMERICAN GEOLOGY
FOR
1918
WITH SUBJECT INDEX

BY

JOHN M. NICKLES



WASHINGTON

CONTENTS.

	Page
Introduction	3
Serials examined	5
Bibliography	9
Outline of subject headings	85
Index	89
Lists	127
Chemical analyses	127
Minerals described	128
Rocks described	128
Geologic formations described	129

BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY FOR 1918, WITH SUBJECT INDEX.

By JOHN M. NICKLES.

INTRODUCTION.

The bibliography of North American geology, including paleontology, petrology, and mineralogy, for the year 1918 follows the plan and arrangement of its immediate predecessors. It includes publications bearing on the geology of the Continent of North America and adjoining islands; also Panama and the Hawaiian Islands. Papers by American writers on the geology of other parts of the world are not included. Textbooks and papers general in character by American authors are included; those by foreign authors are excluded unless they appear in American publications.

As heretofore, the papers, with full title and medium of publication and explanatory note when the title is not fully self-explanatory, are listed under the authors, arranged in alphabetic order. The author list is followed by an index to the literature listed. In this index the entries in one alphabet are of three kinds—first, subject, with various subdivisions, to enable the specialist to ascertain readily all the papers bearing on a particular subject or area; second, titles of papers, many of them abbreviated or inverted, under their leading words; and third, cross references, which have been freely used to avoid too much repetition. The subjects have been printed in black-faced type, the titles of papers and cross references in ordinary type. As it may not be always obvious which subject headings have been adopted, an outline of those used immediately precedes the index.

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OUTLINE OF SUBJECT HEADINGS.

In the following index the subject headings are printed in black-faced type. An outline of these is here given that it may be quickly seen which subject heading of two or more synonyms has been adopted. Thus "petroleum" and not "oil" nor "rock oil" has been chosen. That the specialist may see at a glance under what headings to find cognate literature, subject headings that are more or less closely related have been grouped together under the following heads: Areal or regional, general, economic, dynamic and structural, physiographic, stratigraphic or historical, paleontology, petrology, mineralogy, underground water. In the index the specific entries under the areal or regional subject headings are alphabetized under these same heads arranged in the same order, namely, general, economic, etc.

AREAL OR REGIONAL.

The States and Territories of the Union, Alabama, Alaska, etc.; The Provinces of Canada, Alberta, etc.; Greenland; Arctic regions; Mexico; the countries of Central America; the West Indies, and the single islands; the Hawaiian Islands.

GENERAL.

Associations, meetings; Addresses; Philosophy; History; Biography; Bibliography; Education; Textbooks.

Surveys; Fieldwork; Excursions; Technique; Cartography.

Classification; Nomenclature.

Geochemistry; Chemical analyses (list); Geophysics; Atmosphere; Radioactivity.

Experimental investigations; Borings; Miscellaneous.

ECONOMIC.

Ore deposits, origin; Contact phenomena.

Gold; Placers; Black sands; Silver; Quicksilver; Nickel; Cobalt; Copper; Lead; Zinc; Iron; Magnetite; Manganese; Tin.

Aluminum; Bauxite; Antimony; Bismuth; Tungsten; Vanadium; Uranium; Carnotite ores; Molybdenum; Chromic iron ore.

Platinum; Palladium; Titanium; Rutile; Rare earths; Monazite; Zircon.

Coal; Anthracite; Lignite; Peat.

Petroleum; Natural gas; Oil shales; Asphalt; Albertite; Gilsonite; Bituminous rock.

Stone; Building stone; Granite; Trap; Bluestone; Limestone; Marble; Lime; Gypsum.

Sand; Glass sand; Silica; Quartz; Quartzite; Sandstone; Gravel; Cement and cement materials; Concrete materials; Road materials.

Clay; Kaolin; Bentonite; Fire Clay; Gault; Slate; Shale; Pyrophyllite.

Serpentine; Asbestos; Steatite; Soapstone; Talc.

Precious stones; Diamonds; Sapphires; Turquoise; Tourmaline; Onyx.

Abrasive materials; Corundum; Emery; Garnet; Diatomaceous earth; Tripoli; Volcanic ash; Pumice; Millstones; Whetstones; Novaculite; Feldspar.

Phosphate; Apatite; Potash; Alunite; Nitrate; Glauconite; Marl.
 Salt; Salines; Bromine; Calcium chloride; Borax; Fluorspar.
 Barite; Strontium; Mineral paints.
 Arsenic; Fuller's earth; Infusorial earth; Magnesite; Mica; Graphite.
 Phosphorus; Sulphur; Pyrite.
 Soils.

DYNAMIC AND STRUCTURAL.

Earth, genesis of; Earth, age of; Earth, interior of; Earth, temperature of.
 Volcanism; Volcanoes; Earthquakes; Seismology; Seismographs; Mud volcanoes.

Isostasy; Orogeny; Changes of level.

Magma; Magmatic differentiation; Laccoliths; Intrusions; Dikes; Contact phenomena.

Deformation; Folding; Faulting; Unconformities.

Conglomerates; Concretions; Stalactites; Jointing; Cleavage.

Denudation; Erosion; Coast changes; Coral islands and reefs; Weathering;
 Caves; Sink holes; Wind work; Dunes; Loess; Landslides.

Glaciers; Glacial erosion; Glacial striae; Potholes; Kettle holes.

Sedimentation; Eskers; Kames; Moraines.

Drainage changes.

PHYSIOGRAPHIC.

Geomorphology; Relief maps.

Plains; Prairies; Penuplains; Valleys; Cirques; Deserts; Alluvial fans;
 Deltas; Mounds, natural; Sink holes; Karsts; Natural bridges.

Rivers; Stream piracy; Meanders; Falls; Lakes; Swamps; Marshes; Everglades.

Terraces; Beaches; Shore lines.

STRATIGRAPHIC OR HISTORICAL.

Geologic history; Geologic time; Paleogeography; Paleogeographic maps;
 Paleoclimatology.

Geologic maps; Geologic formations described (list); Tables of formations;
 Unconformities; Borings.

Pre-Cambrian; Paleozoic (undifferentiated); Cambrian; Ordovician; Silurian; Devonian; Carboniferous; Mesozoic (undifferentiated); Triassic; Jurassic; Cretaceous; Tertiary; Quaternary; Recent.

Glacial geology; Glaciation; Drift deposits; Glacial lakes; Erratic boulders;
 Ice ages (ancient).

PALEONTOLOGY.

Geographic distribution; Evolution; Restorations.

Vertebrata; Man, fossil; Mammalia; Aves; Reptilia; Amphibia; Pisces;
 Footprints.

Invertebrata; Arthropoda; Crustacea; Trilobita; Ostracoda; Insecta; Arachnida; Myriapoda.

PETROLOGY.

Rocks, origin; Rocks, structural features; Rocks described (list); Igneous and volcanic rocks; Rock-forming minerals; Lava; Oolite; Dolomite; Pebbles.

MINERALOGY.

Minerals described (list); Crystallography; Pseudomorphism; Paragenesis of minerals; Rock-forming minerals; Meteorites.

UNDERGROUND WATER.

Mineral waters; Thermal waters; Geysers; Springs; Mine waters.

INDEX.

(The numbers refer to entries in the bibliography.)

Abrasives.

General: Katz, 496.

Addresses.

Experiment in geology: Adams, 3.
Geology and the public service: Smith, 873.
Geology in education: Salisbury, 812.
Paleontology of arrested evolution: Ruedemann, 808.
Philosophy of geology and the order of the state: Clarke, 182.
Adirondack anorthosite: Miller, 677.
Age flow and ebb of the Eocene seas: Harris, 406.

Alabama.

Economic.

Iron, hematite, Birmingham district: Singewald, 868.
Oil and gas possibilities: Hager, 387.

Physiographic.

Camp McClellan, Anniston quadrangle: Matthes, 637.

Stratigraphic.

General: Hager, 387.
Correlation of Jackson and Vicksburg deposits: Cooke, 205.
Chester series: Ulrich, 962.
Tertiary, correlation: Vaughan, 979.

Mineralogy.

Tourmaline, Micaville, Randolph County: Van Horn, 967.

Alaska.

General.

Sedimentary record of climate: Blackwelder, 77.
Yukon River region, late Tertiary and Quaternary history: Harrington, 405.

Economic.

Chitina Valley: Moffit, 683.
Gold, silver, copper, and lead in 1917: Martin, 623.
Gold, Nelchina-Susitna region: Chapin, 168.
Lake Clark-central Kuskokwim region: Smith, 878.

Alaska—Continued.

Physiographic.

Cosna-Nowitna region, Alaska: Eakin, 275.
Glaciation: Muir, 701.
Lake Clark-central Kuskokwim region: Smith, 878.
Nelchina-Susitna region: Chapin, 168.
Valdez delta: Johnson, 479.

Stratigraphic.

Chitina Valley: Moffit, 683.
Cosna-Nowitna region, Alaska: Eakin, 175.
Gravina Island: Chapin, 167.
Lake Clark-central Kuskokwim region: Smith, 878.
Nelchina-Susitna region: Chapin, 168.
Ordovician, southeastern Alaska: Kirk, 520.
Paleozoic glaciation, southeastern Alaska: Kirk, 521.
Revillagigedo Island: Chapin, 167.

Paleontology.

Isocrinus, Triassic: Bather, 56.

Petrology.

Igneous rocks, Chitina Valley: Overbeck, 727.

Mineralogy.

Chalmersite: Johnson, 478.

Alberta.

Economic.

Natural gas: Dowling, 265.
Viking field: Slipper, 871.
Petroleum, Peace River region: McLearn, 610.
Sheep River area: Slipper, 870.

Stratigraphic.

Borings, Southern Alberta: Dowling, 262.
Central Alberta: Allan, 12.
Peace River section: McLearn, 610.
Viking area: Slipper, 871.
Whitemans Pass section: Drysdale and Burling, 268.

Paleontology.

Monoclonius, Red Deer River: Brown, 107.

Algal limestone, Belcher Islands: Moore, 693.

Algonkian. *See* Pre-Cambrian.

Alkaline rocks, genesis: Daly, 225.

Aluminum.

General: Hill, 434.

Alunite.

Nevada, Humboldt County, Sulphur: Clark, 176.

Ammonites. *See* Cephalopoda.

Amphibia.

Diplocaulus, structure and relationships: Douthitt, 261.

Permian: Williston, 1056.

Amsden formation, Wyoming: Branson and Greger, 103.

Anne Arundel County, Maryland: Little, 577.

Anomalous dips: Shaw, 857.

Antimony.

General: Bastin, 49.

California: Boalich and Castello, 84.

Idaho, central: Bell, 62.

Nevada, Arabia district: Knopf, 529.

Appalachian peneplains, age: Shaw, 856.

Arctic regions.

Physiographic.

Ellesmere and Grinnell lands: Holte-dahl, 447.

Glaciation: Muir, 701.

Stratigraphic.

Ellesmere and Grinnell lands: Holte-dahl, 447.

Paleontology.

Ellesmere and Grinnell lands: Holte-dahl, 447.

Mineralogy.

Tourmaline, Macdonald Island, Baffin Land: Ledoux, 549.

Arizona.

Economic.

Copper: Finlay, 312.

Ajo, Pima County: De Kalb, 247.

Bisbee, Sacramento Hill deposit: De Kalb, 248.

Jerome district: Finlay, 313; Provot, 769; Rickard, 789.

Cunningham Pass district: Tovote, 951.

Jerome district: Finlay, 313; Provot, 769.

Manganese: Allen and Butler, 15.

Ore deposits of the Southwest: Tovote, 952.

Quicksilver, Phoenix Mountains: Schrader, 826.

Dynamic and structural.

Rhythmic banding of manganese diox-

Arizona—Continued.

Paleontology.

Footprints, Grand Canyon: Lull, 690.

Petrology.

Jerome ores: Rice, 783.

Arkansas.

Economic.

Asphalt, southwestern Arkansas: Miser and Purdue, 679.

Gravel, Caddo Gap and De Queen quadrangles: Miser and Purdue, 680.

Physiographic.

Camp Pike, Little Rock quadrangle: Stephenson and Miser, 910.

Northeastern Arkansas: Shaw, 851.

Stratigraphic.

Caddo Gap and De Queen quadrangles: Miser and Purdue, 680.

Arsenic.

General: Umpleby, 964, 965.

Artesian waters and wells. *See* Under-ground water.

Asbestos.

General: Diller, 256, 259.

Asphalt. *See also* Grahnamite.

General: Northrop, 713.

Arkansas, southwestern: Miser and Purdue, 679.

Associations, meetings.

American Association, Pittsburgh meeting: Salisbury, 811.

Geological Society of America, St Louis meeting, 1917: Hovey, 460.

Paleontological Society, Pacific coast section, eighth meeting: Stock, 915.

Pittsburgh meeting, 1917-18: Bassler, 46.

Aves.

Diatryma, Bighorn Basin, Wyoming: Matthew and Grainger, 648.

Florida: Shufelt, 863.

Balanidae, phylogeny: Ruedemann, 809.

Barbados.

Economic.

Oil prospecting: Craig, 210.

Stratigraphic.

General: Craig, 210.

Barite.

General: Hill, 438.

Missouri: Tarr, 932.

Tennessee, Sweetwater district: Gordon, 343.

Barytes. *See* Barite.

Bathyliths. *See* Intrusions.

Bibliography.

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 Cairnes, D. D., writings: Camsell, 151.
 California, State Mining Bureau publications: Boalich, 28.
 Clark, W. B., writings: Clarke, 186.
 Colorado, Raton Mesa region: Lee, 554.
 Drysdale, C. W., writings: Bancroft, 37; Williams, 1050.
 Eskers, Rochester district, New York: Giles, 337.
 Glacial geology, northeastern North America: Fairchild, 298.
 Ground waters: Melzer, 655.
 Hague, Arnold, writings: Iddings, 467.
 LeRoy, O. E., writings: Schofield, 825.
 Loughridge, R. H., writings: Smith, 872.
 Maryland, Anne Arundel County: Little, 577.
 Mexico: Aguilar, 5.
 New Mexico, Raton Mesa region: Lee, 554.
 Oregon, Cascades: Smith, 884.
 Petroleum, 1915: Burroughs, 128.
 Petrology: Pirsson, 757.
 Physiography: Lobeck, 580.
 Physiographic geology: Gregory, 367.
 Purdue, A. H., writings: Ashley, 22.
 Quicksilver: Bradley, 98.
 Raton Mesa region, Colorado-New Mexico: Lee, 554.
 Sand: Hopkins, 451.
 San Lorenzo series, California: Clark, 172.
 Seely, H. M. writings: Perkins, 750.
 Serpentine, origin: Benson, 63.
 Tungsten: Hartmann, 407.
 Wisconsin, southeastern: Alden, S.
 Wyoming: Bovee, 86.

Biography.

- Bell, Robert: Camsell, 152.
 Brown, A. P.: Penrose, 749; Wherry, 1022.
 Cairnes, D. D.: Camsell, 151.
 Clark, W. B.: Clarke, 186; Mathews, 629.
 Drysdale, C. W.: Bancroft, 37; Williams, 1050.
 Eastman, C. R.: Dean, 289.
 Gratacap, L. P.: Kunz, 540; Stanton, 902.
 Gilbert, G. K.: Davis, 238; Fairchild,

Biography—Continued.

- Williston, S. W.: Brown, 108; Osborn, 724.
 Williams, H. S.: Schuchert, 832; Weller, 1012.
 Birds. *See* Aves.

Bismuth.

- General: Umpleby, 964, 965.

Bituminous rock.

- General: Northrop, 713.

Bivalves. *See* Pelecypoda.

Borax.

- California: Yale and Gale, 1083.
 Death Valley: Young, 1086.

Borings.

- Alberta, southern: Dowling, 262.
 Arkansas, southwestern: Miller and Purdue, 679.
 Deep wells, Pennsylvania and West Virginia: White, 1035, 1036.
 Kansas, central: Perrine, 751.
 Louisiana: Deussen, 251.
 Missouri, Belton area: Wilson, 1057.
 Greene County: Shepard, 860.
 Jackson County: McCourt *et al.*, 606.
 Oklahoma: Aurin, 27, 28.
 Pennsylvania, McDonald: White, 1033.
 West Virginia, Barbour County: Reger and Teets, 778.
 Clarksburg: White, 1033.
 Upshur County: Reger and Teets, 778.

Boulders.

- New York, Ithaca, region: Von Engeln, 983.

Botany, fossil. *See* Paleobotany.

British Columbia.

Economic.

- General: Robertson, 796.
 Building and ornamental stones: Parks, 743.
 Coal, Crowsnest area: Rose, 806.
 Flathead area: Rose, 806.
 Copper, Indian River, Vancouver division: Camsell, 149.
 Crowsnest area: Rose, 806.
 Diatomaceous earth, clay and magnesite, Pacific Great Eastern Railway: Camsell, 150.
 Epsomite lake: Jenkins, 475.

British Columbia—Continued.*Stratigraphic.*

- Crowsnest area: Rose, 806.
 Flathead area: Rose, 806.
 Graham Island: Mackenzie, 614.
 Hazelton district: O'Neill, 720.
 Slocan district: Bancroft, 38.
 Squamish-Lillooet: Camsell, 148.
 Telkwa district: Dolmage, 260.
 Vancouver area: Burwash, 135.
 Whitemans Pass section: Drysdale and Burling, 268.

Mineralogy.

- Cerussite: Thomson, 945.
 Salmo: Ledoux and Walker, 550.

Petrology.

- Vancouver area: Burwash, 135.

Bromine.

- General: Stone, 922.

Bryozoa.

- Costa Rica, Miocene: Canu and Bassler, 153.
 Cyclostomata, principles of classification: Canu and Bassler, 154.
 Panama Canal Zone: Canu and Bassler, 153.

Building stone. *See also* Granite; Lime-stone; Sandstone; Stone.

- British Columbia: Parks, 743.
 Saltsburg sandstone: Brown, 110.

Cadmium.

- General: Siebenthal, 865.

Calcite, solubility in sea-water: Wells, 1013.**Calcite-brucite rocks, origin:** Rogers, 799.**Calcium chloride.**

- General: Stone, 922.

Calico district, California: Palmer, 734.**California.***General.*

- Catalog of publications of State Mining Bureau: Boalich, 82.

Economic.

- Antimony: Boalich and Castello, 84.
 Borax: Yale and Gale, 1083.
 Chromium: Boalich, 81; Bradley *et al.*, 100.
 Calico district, San Bernardino County: Palmer, 734.

California—Continued.*Economic—Continued.*

- Quicksilver: Bradley, 98.
 Strontianite, Barstow, San Bernardino County: Knopf, 530.
 Strontium: Boalich and Castello, 84.
 Tin: Boalich and Castello, 84.
 Tungsten: Boalich and Castello, 83.
 Vanadium: Boalich and Castello, 83.

Dynamic and structural.

- Earthquakes: Mulholland, 703.
 1917: Palmer, 731.
 registration, 1917: Davis, 231.
 San Jacinto, April 21, 1918: Rolfe and Strong, 805; Townley, 953.
 aftershocks: Hamlin, 394.
 southern California: Hamlin, 393; Wood, 1075.
 Fault system, San Jacinto region: Arnold, 21.
 Franciscan sandstone, origin: Davis, 230.
 Lassen Peak, eruptions: Sapper, 815.
 Sierra Nevada, glacial denudation: Muir, 702.

Physiographic.

- Inyo Range and eastern slope of southern Sierra Nevada: Knopf, 527.
 San Jacinto region: Arnold, 21.
 Sierra Nevada, glacial denudation: Muir, 702.

Stratigraphic.

- Calico district, San Bernardino County: Palmer, 734.
 Franciscan sandstone: Davis, 230.
 Glaciation, Sierra Nevada: Knopf, 527.
 Inyo County, geologic map: Waring, 991.
 Inyo Range: Kirk, 519.
 Inyo Range and eastern slope of southern Sierra Nevada: Knopf, 527.
 Meganos group, Eocene: Clark, 171.
 Oligocene: Clark and Arnold, 173.
 Salinas Valley-Parkfield district: English, 294.
 San Lorenzo series: Clark, 172.
 Santa Inez Mountains, Santa Barbara County: Hawley, 415.
 Tehon formations: Dickerson, 255.
 Vaqueros formation: Loel, 581.

California—Continued.*Mineralogy.*

- Christobalite: Rogers, 798.
 Periclase, Riverside: Rogers, 799.
 Ulexite, Lang: Foshag, 318.

Cambrian.*Stratigraphy.*

- Arizona, Grand Canyon: Schuchert, 829.
 California, Inyo Range: Kirk, 519.
 Georgia, Appalachian Valley: Scheerer, 858.
 Idaho, southeastern: Schultz, 833.
 Missouri: Branson, 102.
 barite districts: Tarr, 932.
 Greene County: Shepard, 860.
 Montana, Garnet Range: Pardee, 738.
 northeastern: Collier, 200.
 Pennsylvania, Blair and Huntingdon counties section: Butts, 142.
 South Dakota, Black Hills region: Darton, 228.
 Texas, trans-Pecos front range: Daker and Bowman, 32.
 Virginia, Shenandoah Valley: Hewett *et al.*, 433.
 Wisconsin, southeastern: Alden, 8.
 Wyoming, western: Blackwelder, 76; Schultz, 833.

Paleontology.

- Trilobites, appendages: Walcott, 988.
 Camp Custer region, Michigan: Leverett, 567.
 Camp Devens area, Massachusetts: Atwood, 26.
 Camp Dodge area, Iowa: Lees and Alden, 557.
 Camp Gordon area, Georgia: Matthes, 638.
 Camp Grant quadrangle: Anon., 1905.
 Camp Mills region, Long Island: Alden, 10.
 Camp McClellan, Anniston quadrangle, Alabama: Matthes, 637.
 Camp Pike region, Arkansas: Stephenson and Miser, 910.
 Camp Sherman area, Ohio: Campbell, 147.
 Camp Taylor region, Kentucky: Butts, 141.
 Camp Upton region, New York: Alden, 9.

Canada (general). *See also* names of provinces.

Economic.

- General: Malcolm, 616.
 Clay: Keele, 498.
 Fuel analyses: Stansfield and Nicolls, 899.
 Gold in pre-Cambrian deposits, origin: Wallace, 989.
 Graphite: Spence, 803.
 Mineral production, 1912: Malcolm

Canada (general)—Continued.*Stratigraphic.*

- Cordillera: Burling, 126.
 Pre-Cambrian correlation and nomenclature: Wilson, 1060.

Canal Zone. *See* Panama.

Cannel coal, United States: Ashley, 23.

Carboniferous.*Stratigraphy.*

- Alaska, Gravina and Revillagigedo Islands: Chapin, 167.
 Nelchina-Susitna region: Chapin, 168.
 Amsden formation, Wind River Mountains, Wyoming: Branson and Gregor, 103.
 Arizona, Grand Canyon: Schuchert, 828.
 British Columbia, Crowsnest and Flathead areas: Rose, 806.
 Vancouver area: Burwash, 135.
 California, Inyo Range: Kirk, 519.
 Chester series: Ulrich, 962.
 Idaho, southeastern: Schultz, 833.
 Illinois, Starved Rock State Park: Cady, 143.
 Kansas: Moore and Haynes, 697.
 central: Perrine, 751.
 Kentucky, Shawneetown quadrangle: Lee, 552.
 western: Butts, 140.
 Chester series: Ulrich, 962.
 Kinderhook, lower: Branson, 101.
 Mississippian formations, western Kentucky: Butts, 140.
 Mississippi Valley: Van Tuyl, 972.
 Missouri: Branson, 102.
 Belton area: Wilson, 1057.
 Greene County: Shepard, 860.
 Jackson County, McCourt *et al.*, 606.
 Montana, Birch Creek-Sun River region: Stebinger, 905.
 Garnet Range: Pardee, 738.
 northeastern: Collier, 200.
 southwestern: Condit, 202.
 Kansas, Fort Scott-Boone interval: Berger, 64.
 Oklahoma: Aurin, 27; Cullen, 213; Perry, 752.
 Osage County: Greene, 363.
 Osage Reservation: Bowen, 89, 90, 91; Clark, 174; Emery, 287; Heald, 423; Heald and Mather, 425; Hopkins, 454; Lloyd and Mather, 579; Ross, 807; Winchester *et al.*, 1067.
 Pembroke quadrangle: Heald, 424

Carboniferous—Continued.*Stratigraphy—Continued.*

Texas, Colorado coal field: Drake, 206.
Glass Mountains: Udden, 959.
north-central: Kempher, 504.
Runnels County: Beede and Walte, 59.

trans-Pecos front range: Baker and Bowman, 32.

Wise County: Böse, 85.

Utah, Green River desert: Emery, 288.

Uinta Mountains: Schultz, 834.

Virginia, Buchanan County: Hinds, 439.

Washington, Colville Indian Reservation: Pardee, 741.

West Virginia, Barbour County: Reger and Teets, 778.

Upshur County: Reger and Teets, 778.

Wyoming, western: Blackwelder, 76;
Condit, 202; Schultz, 833.

Paleontology.

Amsden formation, Wind River Mountains, Wyoming: Branson and Greger, 103.

Chester series: Ulrich, 962.

Conemaugh and Pottsville faunas, West Virginia: Price, 767.

Kentucky, western, Chester series: Butts, 140; Ulrich, 962.

Cartography. See also Maps.

Texas, geological mapping: Udden, 958.

Caves.

Tennessee: Bailey, 31.

Cement materials.

General: Bowles, 95.

United States: Burchard, 123.

Central America. *See also* Costa Rica; Guatemala, etc.

Stratigraphic.

Tertiary, correlation: Vaughan, 979.

Cetacea. *See* Mammalia.

Changes of level. *See also* Beaches; Shore lines; Terraces.

Central America: Powers, 764.

Glacial depression and postglacial uplift of northeastern America: Fairchild, 299.

Massachusetts, Boston, postglacial: Shimer, 862.

Porto Rico: Mitchell, 681.

Postglacial continental uplift: Fairchild, 296, 297, 298.

Saginaw basin: Leverett, 568.

Subsidence of reef-encircled islands: Davis, 227.

Chert—Continued.

Origin: Barton, 44; Davis, 232; Van Tuyl, 971.

Missouri: Dean, 240.

Radiolarian cherts of Franciscan group: Davis, 232.

Chester series: Ulrich, 962.

Chromite.

General: Diller, 257; Williams, 1049.

Canada: Malcolm, 616.

Chromium.

California: Boalich, 81; Bradley *et al.*, 100.

Cycadeoid wood structure: Wieland, 1044.

Classification.

Ore deposits: Tovote, 952.

Clay. *See also* Fire clay.

General: Middleton, 669.

British Columbia, Pacific Great Eastern Railway: Camsell, 150.

Canada: Keele, 498.

Manitoba, Swan River valley: Johnston, 484.

Nebraska: Barbour, 39.

Saskatchewan, southern: Davis, 233.

Climate, geologic. *See* Paleoclimatology.

Climatic types of sediments: Blackwelder, 74.

Coal. *See also* Anthracite; Lignite.

General: Gilbert and Pogue, 334; Leshner, 563.

Cannel coal, United States: Ashley, 23.

Fossil fuels, interrelations: Stevenson, 913.

Origin, cannel coal: Ashley, 23.

British Columbia, Crownest and Flathead areas: Rose, 806.

Colorado, Front Range: Whiteside, 1038.

Yampa field: Weston, 1016.

Idaho, southeastern: Schultz, 833.

Kentucky, Letcher County: Crider, 211.

Shawneetown quadrangle: Lee, 552.

Texas, Colorado coal field: Drake, 266.

Webb County, Santo Tomas cannel coal: Ashley, 24.

Utah, Morgan County, Lost Creek field: Clark, 175.

Virginia, Buchanan County: Hinds, 439.

West Virginia, Barbour County: Reger and Teets, 778.

Upshur County: Reger and Teets, 778.

Colorado.

Economic.

- Carnotite deposits, southwestern Colorado: Kithill and Davis, 522.
- Coal, Front Range: Whiteside, 1038.
- Gold, silver, copper, lead, and zinc in 1916: Henderson, 428.
- Molybdenum, Climax: Brown and Hayward, 109; Haley, 391.
- Summit County: Holland, 445.
- Oil possibilities: Ziegler, 1091.
- Oil shales: Adkinson, 4; Alderson, 11; Ziegler, 1089.
- northwestern Colorado: Chase, 169; Hoskin, 459.
- Pyrite, Leadville: Lee, 551.
- Telluride district: Wolf, 1073.
- Tomichi district, Gunnison County: Dick, 252.
- Uranium-vanadium ores, origin: Note-stein, 714.
- Yampa coal field: Weston, 1016.
- Zinc, Leadville: Loughlin, 590.

Dynastic and structural.

- General: Darton, 227.
- Erosion of canyon bottoms: Duce, 269.

Physiographic.

- Estes Park, glacial moraines: Wooster, 1077.
- Rocky Mountain National Park, Colorado: Lee, 553.

Stratigraphic.

- General: Darton, 227; Ziegler, 1901.
- Glaciation, San Juan Mountains: Atwood, 25.
- Green River formation: Winchester, 1066.
- Morrison formation, age: Schuchert, 830.
- North Park: Finlay, 311.
- Raton Mesa region: Lee, 554.
- Rocky Mountain National Park, Colorado: Lee, 553.
- San Juan Mountains: Atwood, 25.
- Tiffany beds: Granger, 357.

Paleontology.

- Beetles, Tertiary: Cockerell, 189.
- San Juan Basin, Mammalia: Granger, 357.
- Tiffany beds fauna: Matthew and Granger, 649.
- Tillodont skull, Huerfano Basin, Colorado: Granger, 358.
- Vermejo and Raton floras: Knowlton, 535.
- Zanycotis (Paleocene bat), Ignacio: Matthew, 639.

Petrology.

Connecticut.

Stratigraphic.

- Cedar Mountain trap ridge: Davis, 236.

Mineralogy.

- Cronstedtite, Trumbull Township: Hoadley, 441.
- Continental clastics, characteristics: Black-welder, 74.
- Continental shelf, origin: Cotton, 209.

Copper.

- General: Butler, 137.
- Alaska: Martin, 623.
- Lake Clark-central Kuskokwim region: Smith, 878.
- Arizona: Finlay, 312.
- Bisbee, Sacramento Hill: De Kalb, 248.
- Jerome district: Finlay, 313; Provot, 769; Rice 783; Rickard, 789.
- Pima County, Ajo: De Kalb, 247.
- British Columbia, Indian River: Cam-sell, 149.
- Telkwa district: Dolmage, 260.
- Central States: Dunlop and Butler, 274.
- Colorado: Henderson, 428.
- Cuba, Oriente: Emerson, 284.
- Eastern States: Hill, 436.
- Idaho: Gerry, 331.
- Manitoba, Schist Lake district: Bruce, 113.
- Nevada: Helkes, 427.
- Clark County, Yellow Pine district: Hale, 389.
- Yerington district: Knopf, 528.
- Ontario, northwestern: Parsons, 746.
- Sudbury: Roberts and Longyear, 791, 792, 793.
- Utah: Helkes, 426.
- Tooele County: Kemp and Billings-ley, 503.
- Washington: Gerry, 331.

Coral islands and reefs.

- Hawaiian Islands: MacCaughy, 604.
- Origin: Davis, 234.
- Subsidence of reef-encircled islands: Davis, 237.

Corals. See Anthozoa.

Correlation. See Stratigraphic.

- Cosna-Nowina region, Alaska: Eakin, 275.

Costa Rica.

Economic.

- Manganese: Spillsbury, 896.

Dynastic and structural.

Cretaceous.

Stratigraphy.

- Alabama: Hager, 387.
 Alberta, central: Allan, 12.
 Peace River section: McLearn, 610.
 Viking field: Slipper, 871.
 Alaska, Chitina Valley: Moffit, 683.
 Nelchina-Susitna region: Chaplin, 168.
 Arkansas, Caddo Gap and De Queen quadrangles: Miser and Purdue, 680.
 southwestern: Miller and Purdue, 679.
 British Columbia, Crowsnest and Flathead areas: Rose, 806.
 Vancouver area: Burwash, 135.
 California, Salinas Valley: English, 294.
 Colorado: Ziegler, 1091.
 Raton Mesa region: Lee, 554.
 Comanchean, central Kansas: Twenhofel, 956.
 Cuba: De Golyer, 241; Hayes, Vaughan, and Spencer, 421.
 Great Plains: Darton, 227.
 Idaho, southeastern: Schultz, 833.
 Kansas: Moore and Haynes, 697.
 central: Perrine, 751.
 Maryland, Anne Arundel County: Little, 577.
 Mexico, Tampico embayment area: Dumble, 271.
 Montana, Birch Creek-Sun River region: Stebinger, 905.
 Garnet Range: Pardee, 738.
 Lake Basin field: Hancock, 395.
 Musselshell Valley: Bowen, 92.
 northeastern: Collier, 200.
 southwestern: Condit, 202.
 Nevada, Yerington district: Knopf, 528.
 New Mexico, Raton Mesa region: Lee, 554.
 Northwest Territory, Great Slave Lake region: Cameron, 146.
 Oklahoma, southern: Stephenson, 909.
 Oregon, Cascades: Smith, 884.
 Porto Rico, Conomo-Guayama region: Hodge, 443.
 San Juan district: Semmes, 845.
 Saskatchewan, southern: Davis, 233.
 South Dakota, Black Hills region: Darton, 228.
 Texas, Camp Bowie area: Shuler, 864.
 Colorado coal field: Drake, 266.
 northeastern: Stephenson, 909.
 Runnels County: Beede and Waite, 59.
 San Antonio area: Muir, 700.
 trans-Pecos front range: Baker and Bowman, 32.
 Val Verde Co.: Roberts and Nash, 794.
 Wise County: Böse, 85.
 Utah, Green River desert: Emery, 288.

Cretaceous—Continued.

Stratigraphy—Continued.

- Wyoming, Hanna Basin: Bowen, 88.
 Park County: Moody and Tallferro, 688.
 Salt Creek oil field: Wegemann, 1010.
 western: Schultz, 833.

Palaeontology.

- Alberta, selachian: Lambe, 544.
 Stegosaurus: Lambe, 545.
 Colorado, Vermejo flora: Knowlton, 535.
 Dakota sandstone, leaves: Gress, 371.
 New Mexico, Vermejo flora: Knowlton, 535.
 Texas, Camp Bowie area: Shuler, 864.
Orinoidea. See also Echinodermata.
 Camarocrinus: Cockerell, 190.
 Embryocrinus problematicus: Hudson, 465.
 Isocrinus, Triassic, Alaska: Bather, 56.
 Mysticocrinus, Silurian, Indiana: Springer, 897.

Crustacea.

- Bulanidae, phylogeny: Ruedemann, 809.
 Lepadidae, derivation: Clarke, 187.
 Panama Canal Zone, Cirripedia: Philbry, 756.
 Decapoda: Rathbun, 774.
 Cristoballite and tridymite, melting points: Ferguson and Merwin, 308.

Cryolite.

General: Burchard, 124.

Cryptogams. *See* Paleobotany.

Crystallography.

- Cerussite, British Columbia: Ledoux and Walker, 550; Thomson, 945.
 Classes of crystals: Wherry, 1026.
 Crystal problems, solution: Blake, 79.
 Etching figures of the dihexagonal alternating type: Honess, 448.
 Geometrical crystallography: Butler, 138.
 Manual of geometrical crystallography: Butler, 139.
 Polyhedron of the diamond lattice: Adams, 2.
 Pyrolusite, Virginia: Watson, 1005.
 Quartz crystals, Centerdale, Rhode Island: Hawkins, 410.
 Quebec, Megantic County: Poitevin and Graham, 761.
 Teaching elementary crystallography: Pogue, 759.
 Tourmaline, Macdonald Island, Baffin Land: Ledoux, 549.

Cuba. *See also* West Indies.*Economic.*

- Cobre, Oriente: Emerson, 284.
 Iron: Weld, 1011.
 Mineral resources: Montouilleu, 684.
 Petroleum fields: DeGolyer, 241.

Cuba—Continued.

Physiographic.

General: Hayes, Vaughan, and Spencer, 421.

Stratigraphic.

General: Hayes, Vaughan, and Spencer, 421.

Petroleum fields: DeGolyer, 241.

Paleontology.

Mammalia: Allen, 13.

Megalocnus: Matthew, 643.

Cystoides.

Agelacrinites and Streptaster, Richmond group: Williams, 1053.

Agelacrinites rectiradlatus, Richmond group, Ohio: Shideler, 861.

Decomposition of rocks. *See* Weathering.

Deep wells: White, 1036.

Deformation of rocks: Adams, 8.

Delaware.

Underground water.

General: Clark *et al.*, 179.

Deltas.

Desert deltas, rate of growth: Keyes, 506.

Valdez, Alaska: Johnson, 479.

Denudation. *See* Erosion.

Deposition. *See* Sedimentation.

Deposition of ores. *See* Ore deposits, origin.

Desert deltas, rate of growth: Keyes, 506.

Desert depressions, origin: Hobbs, 442.

Deserts.

Erosional and degradational processes: Hobbs, 442.

Desiccation of the earth: Von Herrmann, 985.

Devonian.

Stratigraphy.

Alaska, Cosna-Nowitna region: Eakin, 275.

Gravina and Revillagigedo islands: Chapin, 167.

Alberta, Peace River section: McLearn, 610.

British Columbia, Crowsnest and Flathead areas: Rose, 806.

California, Inyo Range: Kirk, 519.

Genesee shale and Tully limestone, relationship: Grabau, 355.

Missouri: Branson, 102.

Greene County: Shepard, 860.

Devonian—Continued.

Stratigraphy—Continued.

West Virginia, Barbour County: Reger and Teets, 778.

Wisconsin, southeastern: Alden, 8.

Wyoming, western: Blackwelder, 76; Schultz, 833.

Paleontology.

Michigan, Detroit River series: Stauffer, 903.

Ontario, Onondaga limestone: Stauffer, 903.

Tennessee, western: Dunbar, 273.

Tully fauna: Grabau, 355.

Diastrophism.

General: Schuchert, 827.

Periodic, production of: Chamberlin, 164.

Dikes.

New York, Adirondacks: Miller, 677.

Utah, Santaquin and Mount Nebo region: Loughlin, 589.

Dinosauria. *See* Reptilia.

Dip, projection of, graphic method: Palmer, 732.

Dips, anomalous: Shaw, 857.

Diplocaulis, structure and relationships: Douthitt, 261.

Dislocation. *See* Faulting.

Distribution. *See* Geographic distribution.

District of Columbia.

Underground water.

General: Clark *et al.*, 179.

Dolomite, formation of: Skeats, 869.

Dolomitization, depth of: Van Tuyl, 972.

Drainage changes.

Kansas, Kaw Lake area: Todd, 948.

Montana, northeastern: Collier, 200.

New York, Tompkins County: Hausman, 409.

Ohio, Camp Sherman region: Campbell, 147.

Drift.

Eolian loess: Todd, 949.

Dryness of sandstone beds, cause: Johnson, 482.

Duluth gabbro: Grout, 380.

Dust fall, March 9, 1918: Winchell and Miller, 1062.

Dynamic and structural (general). *For regional, see the various States. See also list of subject headings on p. 85.*

Dynamic and structural (general)—Contd.

Mechanics of vein formation: Taber, 927.

Marginal sedimentation: Cotton, 209.

Marine limestone strata, dip: Mather, 626.

Red Beds, origin: Knight, 526.

Ring structures in silica: Stansfield, 901.

Salt, separation from saline water and mud: Kindle, 516.

Subsidence of reef-encircled islands: Davis, 237.

Travertine, formation: Emig, 289.

Vein formation: Taber, 927.
central New York: Taber, 926.

Educational. See also Textbooks.

Geology in education: Salisbury, 812.

Preparation of a report: Van Ingen, 968.

Teaching elementary crystallography: Pogue, 759.

Earth, genesis of. See also Dynamic and structural (general).

General: Barrell, 41; Chamberlin, 163.

Faceted form of a collapsing geoid: Keyes, 508.

Earth, temperature.

Boring, deep: Van Orstrand, 970.

Oil-field temperatures: DeGolyer, 244.

Pennsylvania, McDonald well: White, 1033.

West Virginia, Clarksburg well: White, 1033.

Earth movements. See Landslides.**Earth structure, growth of knowledge of: Barrell, 42.****Earthquakes. See also Seismology.**

California: Mulholland, 703.

1917: Palmer, 731.

registration, 1917: Davis, 231.

San Jacinto: Rolfe and Strong, 805; Townley, 953.

April 21, 1918, aftershocks: Hamlin, 394.

southern: Hamlin, 393; Wood, 1075.

Effects in mines: Staunton, 904.

Guatemala, December, 1917-January, 1918: Anon., 1094.

Mexico Sonora: MacDonald 606

Economic (general)—Continued.

Ore deposits of the Southwest: Tovote, 952.

Principles: Emmons, 292.

Review of 1917: Knopf, 531.

Tests for metals in minerals: Fessett, 301.

Text-book: Emmons, 292.

War minerals: Spurr, 898.

Emery.

Virginia: Watson and Steiger, 1008.

Eocene. See Tertiary.**Eolian action. See Windwork.****Epsomite.**

British Columbia: Jenkins, 475.

Washington: Jenkins, 475.

Erosion.

Canyon bottoms, Colorado: Duce, 269.

Potholes: Elston, 281.

Eruptive rocks. See Igneous and volcanic rocks.**Eskers.**

New York, Rochester district: Giles, 337.

Origin: Giles, 337.

Essays. See Addresses.**Eurypterida: O'Connell, 715.****Evolution.**

General: Lull, 599; Mather, 628; Schuchert, 827.

Organic evolution: Lull, 597.

Paleontology of arrested evolution: Reudemann, 808.

Vertebrae, evolution: Williston, 1055.

Experiment in geology: Adams, 3.

Experimental investigations.

Experiments relating to continental deformation: Chamberlin and Richards, 162.

Failure of cavities in crystals and rocks under pressure: Bridgman, 104.

Low-angle faulting: Chamberlin and Miller, 161.

Salt solutions: Kindle, 516.

Faceted form of a collapsing geoid: Keyes, 508.

Faulting.

California, San Jacinto region: Arnold, 21.

Florida.**General.**

- Survey reports: Sellards, 839.
 Vero, climatic conditions: Wieland, 1046.

Economic.

- Mineral production, 1917: Sellards, 841.
 Western Florida: Sellards and Hunter, 842, 843.

Stratigraphic.

- Tertiary, correlation: Vaughan, 979.
 Western Florida: Sellards and Gunter, 842, 843.

Paleontology.

- Bird fossils: Shufelt, 863.
 Foraminifera, Coastal Plain: Cushman, 215.
 Human remains, Vero: Hay, 418, 420.
 Mollusca, DeLand, Volusia County: Mansfield, 619.
 Tapir, Pleistocene, Vero: Sellards, 840.
 Vero, Pleistocene: Nelson, 707.

Mineralogy.

- Meteorite, Eustis, Lake County: Merrill, 662.
 Vivianite, color change: Watson, 1004.
 Plant City: Watson and Gooch, 1007.

Fluorine in sericitization: Paige and Steiger, 729.

Fluorite, optical, southern Illinois: Pogue, 758.

Fluorspar.

- General: Burchard, 124.

Footprints.

- Arizona, Grand Canyon: Lull, 600.

Foraminifera.

- Panama Canal zone: Cushman, 216, 217.
 Pliocene and Miocene, Coastal Plain: Cushman, 215.

Fossil fuels, interrelations: Stevenson, 913.

Fossilization.

- Ring structures in silica: Stansfield, 901.
 Wood replaced by calcite: Greenland, 364.

Fossils. *See* Paleontology.

Franciscan sandstone: Davis, 230.

Fuller's earth.

- General: Middleton, 670.

Gas. *See* Natural gas.

Geochemistry—Continued.

Fluorine in sericitization: Paige and Steiger, 729.

Gold, deposition in nature: Lenher, 562.

Inorganic constituents of crustacea: Clarke and Salkover, 180.

Organic deposits of the sea: Vaughan, 977.

Uranium-vanadium ores, origin: Notestein, 714.

Geodes.

Keokuk region: Wherry, 1021.

Geologic climate. *See* Paleoclimatology.

Geologic formations described. *See* list, p. 129.

Geologic history. *See also* Paleoclimatology; Paleogeography.

Alaska, Chitina Valley: Moffit, 683.

Cosna-Nowitna region: Eakin, 275.

Nelchina-Susitna region: Chapin, 168.

Arizona, Jerome district: Provot, 769.

Colorado, Raton Mesa region: Lee, 554.

Rocky Mountain National Park: Lee, 553.

Cuba: Haynes, Vaughan, and Spencer, 421.

Florida, western: Sellards and Gunter, 842.

Georgia, Appalachian Valley: Shearer, 858.

Illinois, Starved Rock State Park: Cady, 143.

Jackson and Vicksburg deposits, Alabama and Mississippi: Cooke, 205.

Kansas: Moore and Haynes, 697.

crystalline rocks: Moore, 696.

Pleistocene: Todd, 947.

Maryland, Anne Arundel County: Little, 577.

Massachusetts, Boston, postglacial: Shimer, 862.

Mexico, Tampico embayment area: Dumble, 271.

Mississippi, northern and central, Pliocene: Shaw, 850.

Missouri: Branson, 102.

barite districts: Tarr, 932.

Jackson County: McCourt *et al.*, 606.

Nevada, Reese River basin: Waring,

Geologic history—Continued.

- Texas, trans-Pecos front range: Baker and Bowman, 32.
 Washington, Big Bend region, glacial history: Meinzer, 656.
 Colville Indian Reservation: Pardee, 741.
 western: Leighton, 559.
 Wisconsin, southeastern, Pleistocene: Alden, 8.
 Wyoming, Park County: Moody and Tallafarro, 688.

Geologic maps.

- Alaska, Chitina Valley: Moffit, 683.
 Cosna-Nowitna region: Eakin, 275.
 Gravina and Revillagigedo islands: Chapin, 167.
 Lake Clark-central Kuskokwim region: Smith, 878.
 Nelchina-Susitna region: Chapin, 168.
 Arizona, Jerome district: Provot, 769.
 Arkansas, Caddo Gap and De Queen quadrangles: Miser and Purdue, 680.
 southwestern: Miser and Purdue, 679.
 British Columbia, Vancouver area: Burwash, 135.
 Barbados: Craig, 210.
 California, Barstow-Kramer region, San Bernardino County: Knopf, 530.
 Bishop and Mount Goddard (part) quadrangles: Knopf, 527.
 Inyo County: Waring, 991.
 Mount Whitney, Olancho (part), and Ballarat (part) quadrangles: Knopf, 527.
 Parkfield district: English, 294.
 Pleyto oil district: English, 294.
 quicksilver districts: Bradley, 98.
 Salinas Valley, English, 294.
 Colorado, Canon City coal field: Lee, 554.
 Cuba, Hayes, Vaughan, and Spencer, 421.
 Florida, western: Sellards and Gunter, 843.
 Georgia, Coastal Plain: Cooke and Shearer, 206.
 Great Plains: Darton, 227.
 Idaho, southeastern: Schultz, 833.

Geologic maps—Continued.

- Missouri, barite districts: Tarr, 932.
 Jackson County: McCourt *et al.*, 606.
 Kansas City: McCourt *et al.*, 606.
 Montana, Birch Creek-Sun River region: Stebinger, 905.
 Garnet Range: Pardee, 738.
 Lake Basin field: Hancock, 395.
 Musselshell Valley: Bowen, 92.
 northeastern: Collier, 200; Collier and Thom, 201.
 Nevada, Reese River basin: Waring, 993.
 Yerington district: Knopf, 528.
 New Mexico, Grant County: Schwen-nesen, 836.
 New York, Placid quadrangle, central part: Miller, 677.
 North Dakota, Nesson anticline, Williams County: Collier, 199.
 surface (Lake Agassiz): Leverett, 564.
 Oklahoma: Aulin, 27; Snider, 888; White, 1031.
 Osage Reservation: Bowen, 90, 91; Clark, 174; Emery, 287; Heald, 423; Heald and Mather, 425; Hopkins, 454; Lloyd and Mather, 579; Ross, 807.
 southern: Stephenson, 909.
 Ontario: Hopkins, 456.
 Dryden gold area, district of Kenora: Thomson, 943.
 Gauthier township: Burrows, 131.
 Kowkash area: Hopkins, 455.
 Long Lake district: Baker, 34; Burrows, 129.
 Matachewan area: Burrows, 132.
 northwestern, Mine Center region: Parsons, 746.
 Slate Islands: Parsons, 745.
 Toronto region: Coleman, 195.
 Pennsylvania, Boyertown region: Jonas, 485.
 Quebec, Gaspé County, Lemieux: Mailhot, 615.
 Megantic Co.: Poltevin and Graham, 761.
 Rhode Island: Hawkins, 412.
 Saskatchewan, Amisk Lake district: Bruce, 111.

Geologic maps—Continued.

- Utah, Clifton (Deep Creek) district:
 Kemp and Billingsley, 503.
 Green River desert: Emery, 288.
 Morgan County, Lost Creek field:
 Clark, 175.
 Uinta Mountains: Schulz, 834.
 Virginia, Buchanan County: Hinds,
 439.
 Washington, Colville Indian Reserva-
 tion: Pardee, 741.
 West Virginia: White *et al.*, 1037.
 Barbour County: Reger and Teets,
 778.
 Upshur County: Reger and Teets,
 778.
 Wisconsin, southeastern, surficial:
 Alden, 8.
 Wyoming, Park County, Sunshine:
 Moody and Tallaferro, 688.
 Rock Springs uplift and Dry Lake
 dome: Trumbull, 955.
 Salt Creek oil field: 1010.
 western: Schultz, 833.

Geologic time.

- General: Barrell, 40.
 Geological surveys. *See* Surveys.
 Geology and the public service: Smith, 873.
 Geomorphogeny. *See* Physiographic.
 Geomorphology. *See* Physiographic.

Geophysics.

- Calcite, solubility in sea water:
 Wells, 1013.
 Failure of cavities in crystals and
 rocks under pressure: Bridg-
 man, 104.
 Melting points of cristobalite and
 tridymite: Ferguson and Mer-
 win, 308.
 Ternary system $MgO-Al_2O_3-SiO_2$: Ran-
 kin and Merwin, 773.

Georgia.*Economic.*

- Manganese: Anon., 1096.
 Mineral resources: McCallie, 602.
 Potash, Cartersville slates: Shearer,
 858.
 Pyrites deposits: Shearer and Hull,
 859.
 Slate: Shearer, 858.

Physiographic.

- Camp Gordon region: Matthes, 638.

Stratigraphic.

- Clalborne and Jackson deposits: Cooke
 and Shearer, 206.
 Northern Georgia: Shearer and Hull,
 859.
 Slate deposits: Shearer, 858.
 Tertiary, correlation: Vaughan, 979.

Glacial erosion.

- California, Sierra Nevada: Muir, 702.

Glacial geology. *See also* Quaternary.*General.*

- Glacial depression and postglacial
 uplift of northeastern America:
 Fairchild, 209.

Glacial geology—Continued.*General—Continued.*

- Till, character in southern Illinois:
 Shaw, 853.
 Unity of Pleistocene glacial period:
 Wright, 1079.
 Alaska, Nelchina-Susitna region: Cha-
 pin, 168.
 Arctic regions: Muir, 701.
 British Columbia, Vancouver area:
 Burwash, 135.
 California, Sierra Nevada: Knopf, 527.
 Colorado, Estes Park: Wooster, 1077.
 Rocky Mountain National Park:
 Lee, 553.
 San Juan Mountains: Atwood, 25.
 Hawaii, Mount Kea: Bryan, 115.
 Illinois, Chicago area: Wright, 1080.
 Starved Rock State Park: Cady,
 143.
 Iowa, Crawford and Carroll counties:
 Kay, 497.
 Kansas: Todd, 947.
 Manitoba, Hudson Bay Railroad:
 Johnston, 483.
 Wekusko Lake area: Alcock, 6.
 Michigan: Leverett, 565.
 Camp Custer region: Leverett, 567.
 Missouri: Branson, 102.
 Jackson County: McCourt *et al.*,
 606.
 New York, Camp Upton region: Al-
 den, 9.
 Catskill Mountains: Rich, 784.
 Long Island, Camp Mills region:
 Alden, 10.
 Rochester district: Giles, 337.
 Northeastern North America: Fair-
 child, 298.
 North Dakota: Leverett, 564.
 Barnes County, eskers and kames:
 Hard, 400.
 Ohio, Camp Sherman region: Camp-
 bell, 147.
 Ontario, Toronto region: Coleman,
 195.
 Quebec, Timiskaming County: Wilson,
 1058.
 Saginaw basin: Leverett, 568.
 Saskatchewan, southeastern: Stans-
 field, 900.
 southern: Davis, 233.
 Vermont, Wilmington area: Hubbard,
 463.
 Washington, Colville Indian Reserva-
 tion: Pardee, 741.
 western: Leighton, 550.
 Wisconsin, southeastern: Alden, 8.
**Glacial lakes. *See also* Beaches; Shore
 lines; Terraces.**
 Lake Agassiz: Leverett, 564.
 Michigan: Leverett, 565.
 Superior basin: Leverett, 566.
 Wisconsin, southeastern: Alden, 8.
 Glacial period. *See* Glacial geology.

Glaciers.

Yoho Glacier, motion, 1916-17: Wheeler, 1017.

Glass Mountains, Texas: Udden, 959.

Glass sand.

General: Fetteke, 309.

Pennsylvania: Fetteke, 309.

Glauconite in dolomite and limestone of Missouri: Tarr, 931.

Gold.

General: McCaskey and Dunlop, 603.

Deposition in nature: Lenber, 562.

Origin in Canadian pre-Cambrian deposits: Wallace, 989.

Placer deposits, United States: Janin, 471.

Alaska: Martin, 623.

Lake Clark-central Kuskokwim region: Smith, 873.

British Columbia, Slokan district: Bancroft, 38.

Colorado: Henderson, 428.

Eastern States: Hill, 436.

Idaho: Gerry, 331.

Manitoba, Star Lake area: Marshall, 622.

Wekusko Lake area: Alcock, 6, 7.

Montana, Garnet Range: Pardee, 738.

Nevada: Helkes, 427.

Clark County, Yellow Pine district: Hale, 389.

Tonopah: Bastin and Laney, 51.

Ontario, Benoit township: Burrows, 130.

Dryden gold area, district of Kenora: Thomson, 943.

Gauthier township: Burrows, 131.

Kowkash area: Hopkins, 455.

Long Lake district: Baker, 34.

Matachewan area: Burrows, 132.

Richard township: Hopkins, 456.

Quebec, Timiskaming County: Wilson, 1058.

Saskatchewan, Amisk Lake district: Bruce, 111.

Utah: Helkes, 426.

Washington: Gerry, 331.

Yukon: Cockfield, 191.

Government geologic surveys: Smith, 875.

Grand Canyon. *See* Arizona.

Granite.

British Columbia: Parks, 743.

Graphite.

General: Ferguson, 307.

California: Boalich and Castello, 84.

Canada: Spence, 893.

New York, Adirondack Mountains: Ailing, 16.

Origin: Ailing, 16.

Graptolite shales, depth at which formed: Grabau and O'Connell, 356.

Gravel.

Arkansas, Caddo Gap and De Queen quadrangles: Miser and Purdue, 680.

Great Basin lakes, origin: Keyes, 509.

Greenland.

Dynamic and structural.

Nivation and solifluction: Ekblaw, 279.

Stratigraphic.

Parker Snow Bay: Hovey, 461.

Guatemala.

Dynamic and structural.

Earthquake, December, 1917-January 1918: Anon., 1694.

Volcanoes: Sapper, 814.

Physiography.

Eastern Guatemala: Powers, 764.

Stratigraphic.

Eastern Guatemala: Powers, 764.

Gypsum.

General: Stone, 921.

Haiti.

Stratigraphic.

General: Jones, 490.

Hawaiian Islands.

Dynamic and structural.

Formation of islands: MacCaughy, 604.

Volcanoes: Friedlaender, 322.

general: Jaggard, 469.

Kilauea, model: Daly, 224; Sayles, 819.

Stratigraphic.

Glaciation, Mount Kea: Bryan, 115.

History, philosophy, etc.

General: Schuchert, 831.

Earth structure, growth of knowledge of: Barrell, 42.

Experimental investigations: Adams, 3.

Government geologic surveys: Smith, 875.

Mineralogy, 1818-1918: Ford, 317.

Petrology: Pirsson, 757.

Vertebrate paleontology: Lull, 601.

Honduras.

Physiography.

Northern Guatemala: Powers, 764.

Stratigraphic.

Northern Guatemala: Powers, 764.

Petrology.

Northwestern Honduras: Foye, 319.

Huronian. *See* Pre-Cambrian.

Ice age. *See* Glacial geology.

Ice ages (ancient).

Alaska, southeastern, Paleozoic: Kirk, 521.

Iceland spar, Montana: Parsons, 747.

Idaho.

Economic.

Antimony, central Idaho: Bell, 62.

Coeur d'Alene district, Success mine: Hershey, 430; Moore, 699.

Gold, silver, copper, lead, and zinc, 1916: Gerry, 331.

Mineral resources: Bell, 61.

Mining industry, 1916, 1917: Bell, 60, 61.

Idaho—Continued.

Economic—Continued.

- Northern Idaho: Soper, 880.
- Origin of western phosphates: Mansfield, 618.
- Phosphate and coal, southeastern Idaho: Schultz, 833.
- Quicksilver, central Idaho: Bell, 62.
- Southeastern Idaho: Schultz, 833.

Stratigraphic.

- Southeastern Idaho: Schultz, 833.

Paleontology.

- Idaho formation fauna: Merriam, 661.
- Mammalia, Idaho formation: Merriam, 657.

Physiographic.

- Idaho peneplain, age: Lindgren, 575; Livingston, 578; Rich, 786, 787.

Mineralogy.

- Coeur d'Alene district: Shannon, 848.
- Ilvaite, Owyhee County: Shannon, 847.
- Mullanite: Shannon, 846.

- Idaho peneplain, age: Lindgren, 575; Livingston, 578; Rich, 786, 787.

Igneous and volcanic rocks. See also Intrusions: Magmas.

General.

- Alkaline rocks, genesis: Daly, 225.
- Convection, two-phase: Grout, 381.
- Internal structures: Grout, 379, 380.
- Quantitative classification: Washington, 998.

- Alaska, Chitina Valley: Overbeck, 727.
- Cosna-Nowitna region: Eakin, 275.
- Lake Clark-central Kuskokwim region: Smith, 878.

- Nelchina-Susitna region: Chapin, 168.
- Arctic regions, Ellesmere and Grinnell lands: Hottedahl, 447.

- Arizona, Jerome district: Provot, 769.
- British Columbia, Vancouver area: Burwash, 135.

- California, Inyo Range: Knopf, 527.
- Cuba: DeGolyer, 241; Hayes, Vaughan, and Spencer, 421.

- Haiti: Jones, 490.
- Honduras, northwestern: Foye, 319.
- Idaho, southeastern: Schultz, 833.
- Manitoba, Wekusko Lake area: Alcock, 6.

- Montana, Garnet Range: Pardee, 738.
- Musselshell Valley: Bowen, 92.

- Minnesota: Bowles, 96.
- Duluth gabbro: Grout, 380, 382.
- east central: Harder and Johnston, 403.

- Nevada, Reese River basin: Waring, 993.

Igneous and volcanic rocks—Continued.

- North Carolina: Lugeon and Sigg, 596.

- Ontario, Dryden gold area, district of Kenora: Thomson, 943.

- Kowkash area: Hopkins, 455.
- Matachewan area: Burrows, 132.

- Slate Islands: Parsons, 745.

- Oregon, Cascades: Smith, 884.

- Pennsylvania, eastern: Jonas, 485.

- Quebec, Gaspé County, Lemieux: Mailhot, 615.

- Rhode Island: Hawkins, 412.

- Texas, trans-Pecos front range: Baker and Bowman, 32.

- Vermont, Cuttingsville: Eggleston, 277.

- Washington, Colville Indian Reservation: Pardee, 741.

- Wisconsin, southeastern: Alden, 8.

- Wyoming, western: Schultz, 833.

Igneous banding, origin: Grout, 380.

Illinois.

General.

- Solis, Champaign County: Hopkins *et al.*, 450.

- McLean County: Hopkins *et al.*, 449.

Economic.

- Fluorite, optical, southern Illinois: Pogue, 758.

- Oil and gas fields: Wheeler, 1018.

Physiographic.

- Abandoned beaches, south end of Lake Michigan: Wright, 1080.

- Camp Grant quadrangle: Anon., 1095.

Stratigraphic.

- Camp Grant environment: Salisbury and Barrows, 813.

- Chester series: Ulrich, 962.

- Marl deposits, central Illinois: Baker, 33.

- Starved Rock State Park: Cady, 143.

- Till, character in southern Illinois: Shaw, 853.

Paleontology.

- Post-glacial Mollusca, central Illinois: Baker, 33.

Mineralogy.

- Fluorite, optical, southern Illinois: Pogue, 758.

- Indices of dip in rocks: Logan, 583.

Indiana.

Dynamic and structural.

- Mount Carmel fault: Logan, 582.

Insecta—Continued.

Cockroaches, Pennsylvanian, Pennsylvania: Cockerell, 189.

Tsetse flies: Cockerell, 189.

Intrusions. See also Dikes; Igneous and volcanic rocks; Laccoliths; Magmas.

Duluth lopolith: Grout, 378.

Invertebrata (general). See also Anthozoa; Brachiopoda; Bryozoa; Crustacea; Echinodermata; Foraminifera; Insecta; Mollusca; Problematica; Spongia; Vermes.

Amsden formation, Wind River Mountains, Wyoming: Branson and Gregor, 103.

Conemaugh and Pottsville faunas, West Virginia: Price, 287.

Richmond fauna, Little Bay de Noquette, Michigan: Foerste, 315.

Iowa.

Dynamic and structural.

Mud-crack limestone, Devonian: Fenton, 303.

Physiographic.

Camp Dodge area: Lees and Alden, 557.

Stratigraphic.

Cedar Valley beds, Floyd County: Fenton, 303.

Pleistocene, Crawford and Carroll counties: Kay, 497.

Iron.

General: Burchard, 122.

Lateritic ore deposits: Miller, 672.

Titanic ores, microstructure: Warren, 994.

Alabama, Birmingham district: Singewald, 868.

Cuba, Weld, 1011.

Minnesota, Cuyuna district: Harder and Johnston, 403; Newton, 710.

magnetite deposits of Duluth gabbro, magnetic surveys of: Broderick, 106.

Mesabi range: Wolff, 1074.

Ontario, Kowkash area: Hopkins, 455.

northwestern: Parsons, 746.

Rainy River district: Robinson, 797.

Porto Rico, Mayaguez, Ilmonite: Fettke and Hubbard, 310.

Quebec, Belcher Islands: Moore, 602, 693.

Santo Domingo: Brinsmade, 105.

Isobases of postglacial uplift: Fairchild, 296, 297.

Jamaica.

Stratigraphic.

Tertiary, correlation: Vaughan, 979.

Jerome district, Arizona: Finlay, 313.

Jurassic.

Stratigraphy.

Alaska, Chitina Valley: Moffat, 683.

Gravina and Revillagigedo islands: Chapin, 167.

Nelchina-Susitna region: Chapin, 168.

British Columbia, Crowsnest and Flathead areas: Rose, 806.

Vancouver area: Burwash, 135.

Cuba: DeGolyer, 241; Hayes, Vaughan, and Spencer, 421.

Idaho, southeastern: Schultz, 833.

Montana, Birch Creek-Sun River region: Stebinger, 905.

Garnet Range: Pardee, 738.

northeastern: Collier, 200.

southwestern: Condit, 202.

Morrison formation, age: Schuchert, 830.

South Dakota, Black Hills region: Darton, 228.

Utah, Green River desert: Emery, 288.

Morgan County, Lost Creek field: Clark, 175.

Wyoming, Salt Creek oil field: Wegemann, 1010.

western: Condit, 202; Schultz, 833.

Kanawha black flint: Price, 768.

Kansas.

Economic.

Natural gas: Moore and Haynes, 697.

Petroleum: Moore and Haynes, 697; Whitaker *et al.*, 1030.

Dynamic and structural.

General: Darton, 227.

Central Kansas: Perrine, 751.

Wood replaced by calcite, Russell: Greenland, 364.

Physiographic.

Camp Funston region: Moore, 605.

Kaw Lake area: Todd, 948.

Stratigraphic.

General: Darton, 227; Moore and Haynes, 697.

Borings, central Kansas: Perrine, 751.

Central Kansas: Perrine, 751.

Comanchean, central Kansas: Twenhofel, 956.

Crystalline rocks, geologic history: Moore, 696.

Fort Scott-Boone interval: Berger, 64.

Kaw Lake area: Todd, 948.

Pleistocene history: Todd, 947.

Paleontology.

Wood replaced by calcite, Russell: Greenland, 364.

Petrology.

Crystalline rocks: Moore and Haynes, 697.

Kentucky.

Economic.

Coal, Letcher County: Crider, 211.

Shawneetown quadrangle: Lee, 552.

Oil fields: Thayer, 938.

Kentucky—Continued.

Economic—Continued.

Petroleum : Pemberton, 748.

Shawneetown quadrangle : Lee, 552.

Physiographic.

Camp Taylor region : Butts, 141.

Stratigraphic.

Chester series, western Kentucky : Ulrich, 962.

Geologic map : Sellier, 844.

Georgetown quadrangle, map : Miller, 671.

Mississippian formations, western Kentucky : Butts, 140.

Shawneetown quadrangle : Lee, 552.

Paleontology.

Chester series, western Kentucky : Ulrich, 962.

Mississippian formations, western Kentucky : Butts, 140.

Killdeer Mountains, North Dakota : Quirk, 772.

Kowkash gold area, Ontario : Hopkins, 445.

Labrador.

General : Coleman, 196.

Laccolithic intrusion, mechanics of : Keyes, 507.

Lacustral record of past climates : Keyes, 510.

Lafayette formation : Shaw, 850.

Lakes.

Great Basin lakes, origin : Keyes, 509, 510.

Lakes, extinct.

Lake Bonneville, age : Keyes, 510.

Lake Lohontain, age, mammalian evidence : Merriam, 660.

Lakes, glacial. *See* Glacial lakes.

Lamellibranchiata. *See* Pelecypoda.

Landslide.

Colorado, San Juan Mountains : Atwood, 25.

Langley field, Hampton quadrangle, Virginia : Stephenson, 907.

Lava.

Oregon, Cascades : Smith, 884.

Lead.

Alaska : Martin, 623.

California, Inyo Range : Knopf, 527.

Central States : Dunlop and Butler, 274.

Colorado : Henderson, 428.

Eastern States : Hill, 436.

Idaho : Gerry, 331.

Missouri-Kansas-Oklahoma zinc dis-

Lapididae, derivation : Clarke, 187.

Lignite. *See also* Coal.

Saskatchewan, southern : MacLean, 609.

Lime.

General : Loughlin, 586.

Limetone.

Oklahoma : Cullen, 213.

Ontario : Frechette, 320.

Lithogenesis : Grabau, 354.

Lithology. *See* Petrology.

Lithothamnidae, Panama Canal Zone : Howe, 462.

Loess.

General : Tomlinson, 950.

Eolian loess : Todd, 949.

Louisiana : Emerson, 286.

Long Lake gold mine, Sudbury district, Ontario : Baker, 34.

Lopolith : Grout, 378.

Louisiana.

Economic.

Oil pools, Gulf Coast country : Matteson, 634.

Petroleum : Deussen, 251.

Northern Louisiana : Bates, 55.

Red River field : Bates, 54.

Salt domes, intrusive origin : Rogers, 803.

structure : Lucas, 594.

Dynamic and structural.

Red River, Crichton oil field : Bates, 54.

Stratigraphic.

Borings : Deussen, 251.

De Soto-Red River oil field : Bates, 54.

Loess deposits : Emerson, 285, 286.

Red River, Crichton oil field : Bates, 54.

Tertiary, correlation : Vaughan, 979.

Lower Silurian. *See* Ordovician.

Magma. *See also* Intrusions.

Alkaline rocks, genesis : Daly, 225.

Convection, two-phase : Grout, 381.

New York, Adirondack Mountains, syenite-granite series : Miller, 678.

Two-phase convection : Grout, 381.

Vermont, Cuttingsville : Eggleston, 277.

Magmatic differentiation.

Duluth rocks : Grout, 382.

Pegmatites of Duluth gabbro : Grout, 377.

Magnetite.

Characteristics : Bates, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Maine.*Physiographic.*

Pleistocene shore lines: Kats, 492, 493.

Petrology.

Litchfieldite: Daly, 226.

Mineralogy.

Mt. Mica and Mt. Apatite: Manchester and Bather, 617.

Mammalia.

Artiodactyla, Uinta Basin, Utah: Peterson, 753.

Bats, Porto Rico: Anthony, 20.

Camelidae: Matthew, 646.

Canis, subdivision: Merriam, 658.

Colorado, San Juan Basin: Granger, 357.

Cuba: Allen, 13.

Edentata: Stock, 916.

Equidae, revision: Osborn, 723.

Felis, Rancho La Brea, California: Merriam, 659.

Idaho formation: Merriam, 657.

Mammoth, New York: Clarke, 181.

Mastodon, New York: Clarke, 181.

South Carolina: Loomis, 584.

South Dakota: Osborn, 726.

Megalocnus: Matthew, 643.

Moropus: Matthew, 642; Osborn, 725.

New Mexico, San Juan Basin: Granger, 387.

Northarctus: Granger and Gregory, 359.

Nothodectes, dentition: Matthew, 641.

Perissodactyla, absence of pollex: Matthew, 640.

Pinnepedia: Kellogg, 500.

Pleistocene fauna, Hawver Cave, California: Stock, 917.

Proboscidea, generic nomenclature: Matthew, 645.

phylogeny: Osborn, 726.

Rhinoceros, Pliocene: Matthew, 647.

Rodentia, Porto Rico: Anthony, 19.

Tapir, Pleistocene, Florida: Sellards, 840.

Tiffany beds fauna: Matthew and Granger, 649.

Tillodont skull, Huerfano Basin, Colorado: Granger, 358.

Zanycteris (Paleocene bat), Colorado: Matthew, 639.

Man, fossil.

Antiquity in America: Holmes, 446.

Florida, Vero: Hay, 418, 419, 420; Nelson, 707; Wieland, 1040.

Massachusetts, Boston: Shimer, 862.

Marble.

British Columbia: Parks, 743.

Marginal sedimentation: Cotton, 209.

Marine clastics, diagnostic characteristics: Kindle, 518.

Marine limestone strata, superficial dip: Mather, 626.

Marl.

General: Loughlin, 586.

Manganese.

General: Hewett, 431; Palmer, 733; Watson, 1003.

Lateritic ore deposits: Miller, 672.

Arizona: Allen and Butler, 15.

British Columbia, Slocan district: Bancroft, 38.

California: Bradley *et al.*, 100; Lunderback, 585.

Colorado River desert region: Jones, 486.

Costa Rica: Spillsbury, 896.

Georgia: Anon., 1096.

Montana, Butte: Pardee, 739.

Madison County: Pardee, 740.

Nevada, Clark County: Hale, 390.

Oregon: Anon., 1097.

Lake Creek: Pardee and Parks, 742.

Tennessee, Bradley County: Purdue, 771.

eastern: Stose and Schrader, 923.

Texas, Val Verde Co.: Roberts and Nash, 794.

Vermont, South Wallingford: Jones, 488.

Virginia, Frederick County: Haney, 397.

Shenandoah Valley: Hewett *et al.*, 433.

Washington, northern: Jenkins, 473.

Manitoba.*Economic.*

Clay, Swan River valley: Johnston, 484.

Copper, Schist Lake district: Bruce, 113.

Gold, southeastern Manitoba: Marshall, 621.

Star Lake area: Marshall, 622.

Wekusko Lake, origin: Alcock, 7.

Herb Lake district: Bruce, 112.

Hudson Bay Railway: Johnston, 483.

Molybdenum, Falcon Lake area: Bruce, 114.

Northern Manitoba: Bruce, 112; Tyrell, 957; Wallace and DeLury, 990.

Sand, Swan River valley: Johnston, 484.

Schist Lake district, northern Manitoba: Bruce, 112, 113.

Southeastern Manitoba: Marshall, 621.

Star Lake area: Marshall, 622.

Tungsten, Falcon Lake: DeLury, 249.

Wekusko Lake area, northern Manitoba: Alcock, 6.

Stratigraphic.

Amisk-Athapuskow Lake district: Bruce, 111.

Falcon Lake area: Bruce, 114.

Hudson Bay Railway: Johnston, 483.

Northern Manitoba: Bruce, 112; Wallace and DeLury, 990.

Schist Lake district, northern Manitoba: Bruce, 112, 113.

Silurian, Hudson Bay region: Savage, 816.

Manitoba—Continued.*Stratigraphic*—Continued.

Southeastern Manitoba: Marshall, 621.

Wekusko Lake area, northern Manitoba: Alcock, 6.

Paleontology.

Silurian, Hudson Bay region: Savage, 816.

Map making. *See* Cartography.Maps. *See* Cartography; Geologic maps.**Maryland.***Economic*.

Anne Arundel County: Little, 577.

Physiographic.

General: Clark, 178.

Anne Arundel County: Little, 577.

Stratigraphic.General: Clark *et al.*, 179.

Anne Arundel County: Little, 577.

Ordovician, Piedmont: Bassler, 47, 48.

Underground water.General: Clark *et al.*, 179.

Anne Arundel County: Little, 577.

Massachusetts.*Physiographic*.

Camp Devens area: Atwood, 26.

Stratigraphic.

Boston, postglacial history: Shimer, 862.

Matatchewan gold area, Ontario: Burrows, 132.

Mechanics of vein formation: Taber, 927.

Metamorphism.

British Columbia, Vancouver area: Burwash, 135.

Nevada, Yerington district: Knopf, 528.

Rhode Island: Hawkins, 412.

Volume changes in metamorphism: Lindgren, 576.

Meetings. *See* Associations.

Meganos group, Eocene, California: Clark, 171.

Mercury. *See* Quicksilver.**Mesozoic (undifferentiated).**

Alaska, Lake Clark-central Kuskokwim region: Smith, 878.

Franciscan sandstone: Davis, 230.

Nevada, Reese River basin: Waring, 993.

Oregon, Cascades: Smith, 884.

Meteorites.*General*.

Fluorine and tin in meteorites: Merrill, 666.

Heating meteoric stones, effects: Merrill, 666.

Mexico.*General*.

Bibliography: Aguilar, 5.

Economic.

Jalisco: Villafañá, 982.

Oil indications, Pacific coast: Palacios, 730.

Petroleum: Bustamante, 136; De Golyer, 245.

Soda deposits, Lake Texcoco: Flores, 314.

Sonora, ore deposits: Tovote, 952.

Sulphides, relation to water level in Mexico: Lucke, 595.

Dynamic and structural.

Desert phenomena, San Luis Potosí: Wittich, 1070.

Earthquake, Sonora: MacDonald, 608.

Oil field temperatures: DeGolyer, 244.

Seismology in Mexico: Muñoz Lumblér, 704.

Physiographic.

Tampico embayment area: Dumble, 271.

Stratigraphic.

Cienega, Mexico: Galvez, 326.

Jalisco: Villafañá, 982.

Lower California, Magdalena Bay: Galvez, 324.

Oil possibilities, southern Tamaulipas: Ordóñez, 721.

Tamaulipas, southern: Ordóñez, 721.

Tampico embayment area: Dumble, 271.

Tequesquipan, Mexico: Galvez, 325.

Tertiary, correlation: Vaughan, 979.

Paleontology.

Pleistocene Mollusca, Magdalena Bay, Lower California: Dall, 221.

Mineralogy.

General: Wittich, 1069.

Mazapilite and arseniosiderite, identity: Larsen, 548.

Underground water.

Cienega, Mexico: Galvez, 326.

Lower California, Magdalena Bay: Galvez, 324.

Tequesquipan, Mexico: Galvez, 325.

Mica.

General: Schaller, 824.

Michigan.*Physiographic*.

Camp Custer region: Leverett, 567.

Glacial lakes, Superior basin: Leverett, 566.

Northern Peninsula, surface geology: Leverett, 565.

Southern Peninsula, surface geology:

Michigan—Continued.*Stratigraphic*—Continued.

Southern Peninsula, surface geology: Leverett, 565.

Paleontology.

Devonian, Detroit River series: Stauffer, 903.

Richmond fauna, Little Bay de Noquette: Foerste, 315.

Military geology and topography: Gregory, *et al.*, 368.

Mineral reserves: Smith, 876a.

Mineral resources. *See* Economic (general).

Mineral water.

General: Ellis, 280.

Canada: Elworthy, 282.

Mineralogy (general). *See also* Meteorites; Technique. *For regional, see names of States. For particular minerals, see list, p. 128.*

Beryl, prismatic cleavage: Lane, 546.

Colerainite, origin: Poltevin, 760.

Copiapite in coal: McCaughey, 605.

Crystallized mineral specimens, developing: Grenzgi, 370.

Diasporite, field identification: Wherry, 1025.

Etching figures of the dihexagonal alternating type: Honess, 448.

Famous mineral localities, Keokuk geode region: Wherry, 1021.

Gypsum and glauberite, thermo-optical observations: Kraus and Peck, 536.

Handbook: Butler, 189.

History, 1818-1918: Ford, 317.

Indexing a mineral collection: Fairbanks, 295.

Iridescent quartz, New York City: Scott, 838.

Iron, cause of blue colors in minerals: Wherry, 1027.

Lazulite: Merrill, 667.

Mazapillite and arsenosiderite, identity: Larsen, 548.

Saline dome minerals, Texas-Louisiana Coastal Plain: Hawkins, 414.

Vivianite, color change: Watson, 1004.

Minnesota.*Economic*.

Iron, Cuyuna district: Harder and Johnston, 403; Newton, 710.

Mesabi range: Wolff, 1074.

Magnetite deposits of Duluth gabbro, magnetic survey of: Broderick, 106.

Stone: Bowles, 96.

Stratigraphic.

General: Bowles, 96.

Cuyuna district: Harder and Johnston, 403.

Duluth lopolith: Grout, 378.

East central Minnesota: Harder and Johnston, 403.

Minnesota—Continued.*Stratigraphic*—Continued.

Pegmatites of Duluth gabbro: Grout, 377.

Petrology.

General: Bowles, 96.

Duluth gabbro: Grout, 380, 382.

East central Minnesota: Harder and Johnston, 403.

Pegmatites of Duluth gabbro: Grout, 377.

Mineralogy.

General: Bowles, 96.

Miocene. *See* Tertiary.

Miscellaneous. *See also* Addresses.

Philosophy of geology and the order of the state: Clarke, 182.

Mississippi.*Physiographic*.

Northern and central Mississippi: Shaw, 850.

Pliocene history, northern and central Mississippi: Shaw, 850.

Stratigraphic.

Correlation of Jackson and Vicksburg deposits: Cooke, 205.

Pliocene history, northern and central Mississippi: Shaw, 850.

Tertiary, correlation: Vaughan, 979.

Mississippian. *See* Carboniferous.

Mississippian chert of St. Louis area: Barton, 44.

Mississippian formations, western Kentucky: Butts, 140.

Missouri.*General*.

Greene County: Shepard, 860.

Economic.

General: Branson, 102.

Barite: Tarr, 932.

Greene County: Shepard, 860.

Jackson County: McCourt *et al.*, 606.

Mineral resources: Buehler, 121.

Oil and gas possibilities, Belton area: Wilson, 1057.

Washington County, barite district: Tarr, 932.

Dynamic and structural.

Chert, origin: Dean, 240.

Physiographic.

General: Branson, 102.

Jackson County: McCourt *et al.*, 606.

Stratigraphic.

General: Branson, 102.

Barite districts: Tarr, 932.

Belton area: Wilson, 1057.

Greene County: Shepard, 860.

Grassy Creek shale: Greger, 365.

Jackson County: McCourt, *et al.*, 606.

Kinderhook, lower: Branson, 101.

Washington County, barite district: Tarr, 932.

Paleontology.

General: Branson, 102.

Grassy Creek shale: Greger, 365.

Missouri—Continued.**Petrology.**

Chert, origin: Dean, 240.

Mineralogy.

Joplin district: Hawkins and Wherry, 414.

Mollusca. See also Cephalopoda; Gastropoda; Pelecypoda.**General.**

Nomenclature rectifications: Henderson, 429.

Arisalg series, Nova Scotia: McLearn, 611.

California, San Lorenzo series: Clark, 172.

Florida, Volusia County: Mansfield, 619.

Illinois, postglacial: Baker, 33.

Mexico, Lower California, Pleistocene: Dall, 221.

Pleurodonte debooyi, St. Croix, West Indies: Bartsch, 45.

Washington, Oligocene: Van Winkle, 974.

Molluscoidea. See Brachiopoda; Bryozoa.

Molybdenum.

General: Wolf, 1072.

Occurrence: Ball, 36.

California: Boalich and Castello, 83.

Canada: Malcolm, 616.

Colorado, Climax: Brown and Hayward, 109; Haley, 391.

Summit County: Holland, 445.

Manitoba, Falcon Lake area: Bruce, 114.

Ontario: Parsons, 744.

Dryden gold area, district of Kenora: Thomson, 943.

Quebec, Pontiac County: Thomson, 944.

Quyon district: Wilson, 1059.

Timiskaming County: Wilson, 1058.

Monks Mound: Crook, 212.

Montana.**Economic.**

Garnet Range: Pardee, 738.

Iceland spar: Parsons, 747.

Lake Basin field, oil and gas possibilities: Hancock, 395.

Manganese, Butte: Pardee, 739.

Madison County: Pardee, 740.

Oil and gas possibilities, Birch Creek-Sun River area, northwestern Montana: Stebinger, 905.

Oil shales, Beaverhead County: Bowen, 87.

Dynamic and structural.

Birch Creek-Sun River area, northwestern Montana: Stebinger, 905.

Lake Basin field: Hancock, 395.

Musselshell Valley, anticlines: Bowen, 92.

Montana—Continued.**Physiographic.**

Garnet Range: Pardee, 738.

Northeastern Montana: Collier and Thom, 201.

Stratigraphic.

Birch Creek-Sun River area, northwestern Montana: Stebinger, 905.

Flaxville gravel: Collier and Thom, 201.

Garnet Range: Pardee, 738.

Lake Basin field: Hancock, 395.

Musselshell Valley: Bowen, 92.

Northeastern Montana: Collier, 200.

Southwestern Montana: Condit, 202.

Palaeontology.

Oligocene plants: Jennings, 476.

Mineralogy.

Iceland spar: Parsons, 747.

Lazulite: Merrill, 667.

Mullanite: Shannon, 846.

Moraines.

Colorado, Estes Park: Wooster, 1077.

San Juan Mountains: Atwood, 25.

Ohio, Holmesville: Cole, 192.

Wisconsin, southeastern: Alden, 8.

Moropus: Matthew, 642.

Morrison formation: Mook, 601; age: Schuchert, 830.

Mounds.

Origin: Crook, 212.

Mount Rainier National Park: Matthes, 636.

Natural gas.

General: Northrop, 711; Wyer, 1082.

Gas sands: Knapp, 525.

Gasoline vapor content change: Sieplein, 866.

Migration: Ziegler, 1090.

Movement through rocks: Washburne, 996; Ziegler, 1090.

Alberta: Dowling, 265.

Viking field: Slipper, 871.

Illinois: Wheeler, 1018.

Louisiana, northern: Bates, 55.

Oklahoma, Osage Reservation: Bowen, 90, 91; Clark, 174; Emery, 287; Heald, 423; Heald and Mather, 425; Hopkins, 454; Lloyd and Mather, 579; Ross, 807; White, 1031.

Pawhuska quadrangle: Heald, 424.

West Virginia: White, 1032.

Wyoming, Cretaceous fields: Trumbull, 955.

Nebraska.**Economic.**

Clay: Barbour, 39.

Potash: Condra, 203.

Dynamic and structural.

General: Darton, 227.

Stratigraphic.

General: Darton, 227.

Nelchina-Susitna region, Alaska: Chapin, 168.

Nevada.*Economic.*

Alunite, Sulphur, Humboldt County: Clark, 176.

Antimonial silver-lead veins, Arabia district: Knopf, 529.

Gold, silver, copper, lead, and zinc in 1916: Heikes, 427.

Manganese, Clark County: Hale, 390.

Silver, Wonder: Young, 1087.

Tonopah ores, genesis: Bastin and Laney, 51.

Yellow Pine district, Clark County: Hale, 389.

Yerington district: Knopf, 523.

Stratigraphic.

Arabia district: Knopf, 529.

Reese River basin: Waring, 993.

Yellow Pine district, Clark County: Hale, 389.

Yerington district: Knopf, 523.

Petrology.

Yerington district: Knopf, 523.

Underground water.

Reese River basin: Waring, 993.

New Hampshire.*Physiographic.*

Pleistocene shore line: Katz, 492, 493.

Mineralogy.

Beryl, Acworth: Holden, 444.

New Jersey.*General.*

State geologist, report: Kummel, 537.

Physiographic.

Northern New Jersey: Lobeck, 580.

Mineralogy.

Gaulette, Franklin Furnace: Levison, 569.

Thaumasite: Wherry, 1020.

New Mexico.*Economic.*

Fluorine in sericitization, Tyrone district: Palge and Steiger, 729.

Ore deposits of the Southwest: Tovote, 952.

Sierra del Oro, northern New Mexico: Keyes, 512.

Sulphur, Jemez Canyon: Mansfield, 618a.

Dynamic and structural.

Sierra del Oro, northern New Mexico: Keyes, 512.

Physiographic.

Southwestern New Mexico: Schwennesen, 836.

Stratigraphic.

Raton Mesa region: Lee, 554.

Paleontology.

Nothodectes, San Juan Basin: Matthew, 641.

San Juan Basin, Mammalia: Granger, 357.

Vermejo and Raton Floras: Knowlton, 535.

New Mexico—Continued.*Underground water.*

Animas, Playas, Hachita, and San Luis basins: Schwennesen, 836.

New York.*General.*

Geological survey, report: Clarke, 181.

Economic.

Graphite, Adirondack Mountains: Alling, 16.

Mineral resources, 1916: Newland, 709.

Zinc ores, Edwards district, St. Lawrence County: Smyth, 887.

Dynamic and structural.

Boulders borne by icebergs, Ithaca region: Von Engel, 983.

Plastic deformation of Grenville limestone, Port Henry region: Newland, 706.

Strand markings, Portage group: Clarke, 184.

Unstable rocks under Hudson River: Berkey, 65.

Vein formation, central New York: Taber, 926.

Physiographic.

Camp Mills region, Long Island: Alden, 10.

Camp Upton region: Alden, 9.

Cliff Haven: Hudson, 464.

Drainage modification, Tompkins County: Hausman, 400.

Finger Lake basins, origin: Von Engel, 984.

Rochester district: Giles, 337.

Southeastern New York: Lobeck, 580.

Stratigraphic.

Adirondack anorthosite: Miller, 677.

Adirondack graphite deposits: Alling, 16.

Cayuga and Onondaga counties: Taber, 926.

Cliff Haven, Hudson, 464.

Clinton: Chadwick, 158.

Eskers, Rochester district: Giles, 337.

Geological survey, report: Clarke, 181.

Glaciation, Catskill Mountains: Rich, 784.

Gouverneur quadrangle: Cushing, 214.

Lake Bonaparte quadrangle: Buddington and Smyth, 118.

Lake Placid quadrangle: Miller, 675.

Schroon Lake quadrangle: Miller, 675.

Sherburne bar, significance in Devonian stratigraphy: Grabau, 348.

Silurian: Chadwick, 159.

Syenite-granite series, Adirondack Mountains: Miller, 678.

Tully limestone and Genesee shale, relationship: Grabau, 355.

Paleontology.

Clinton: Chadwick, 158.

Devonian glass sponges: Clarke, 183.

Embryocrinus problematicus: Hudson, 465.

New York—Continued.

Petrology.

Adirondack anorthosite: Miller, 676, 677.

Syenite-granite series, Adirondack Mountains: Miller, 678.

Mineralogy.

Quartz, iridescent, New York City: Scott, 838.

Nickel.

California: Boalich and Castello, 84.

Lateritic ore deposits: Miller, 672.

Ontario, Sudbury: Roberts and Longyear, 791, 792, 793.

Timiskaming district: Baker, 35.

Nitrates.

Oregon, southeastern: Williams, 1048.

Tennessee, cave deposits: Glenn, 340.

Nivation, northern Greenland, Ekblaw, 279.

Nomenclature. See also under Stratigraphic.

Surficial formations: Shaw, 850.

North Carolina.

Stratigraphic.

Tertiary, correlation: Vaughan, 979.

Paleontology.

Foraminifera, Coastal Plain: Cushman, 215.

Petrology.

Eruptive rocks: Lugeon and Sigg, 596.

Mineralogy.

Famous mineral localities, gem regions: Trudell, 954.

North Dakota.

General.

Road materials: Hard, 399.

Economic.

Lignite, Williams Co.: Collier, 199.

Nesson anticline, Williams County: Collier, 199.

Dynamic and structural.

Valley filling: Collier, 198.

Physiographic.

Eskers and kames, Barnes County: Hard, 400.

Killdeer Mountains: Quirke, 772.

Lake Agassiz: Leverett, 564.

Stratigraphic.

Killdeer Mountains: Quirke, 772.

Nesson anticline, Williams County: Collier, 199.

Northwest Territory.

Dynamic and structural.

Sedimentation, Mackenzie River basin: Kindle, 515.

Stratigraphic.

Great Slave Lake region: Cameron, 146.

Notharctus: Granger and Gregory, 359.

Nothodectes, dentition: Matthew, 641.

Nova Scotia.

Economic.

Oil shales, Pictou, Cape Breton: Spence, 892.

Nova Scotia—Continued.

Stratigraphic.

Arlsail series: McLearn, 611.

Ohio.

Economic.

Berea sand, lithology: Panyity, 736.

Physiographic.

Camp Sherman region: Campbell, 147.

Stratigraphic.

Berea sand, lithology: Panyity, 736.

Deep wells: White, 1036.

Holmesville terrace and moraine: Cole, 192.

Paleontology.

Agelacrinites and Streptaster, Richmond group: Williams, 1053.

Agelacrinites rectiradiatus, Richmond group: Shideler, 861.

Mineralogy.

Copiapite in coal: McCaughey, 605.

Oil. See Petroleum.

Oil shales.

General: Alderson, 11; Gilbert and Pogue, 335.

Colorado, northwestern: Adkinson, 4; Alderson, 11; Chase, 169; Hoskin, 459; Ziegler, 1089.

Montana, Beaverhead County: Bowen, 87.

Nova Scotia, Pictou: Spence, 892.

Utah: Adkinson, 4; Ziegler, 1089.

Unta Basin: Winchester, 1065.

Oklahoma.

Economic.

Age of oil in the southern fields:

Matteson, 635; Pratt, 765.

Lime resources: Cullen, 213.

Mid-Continent field: Bloesch, 80.

Mineral resources: Snider, 888.

Natural gas, Osage Reservation:

Bowen, 90, 91; Clark, 174;

Emery, 287; Heald, 423; Heald

and Mather, 425; Hopkins, 454;

Lloyd and Mather, 579; Ross,

807; White, 1031.

Oil sands, correlation: Aurin, 28.

Osage Reservation: Bowen, 89, 90, 91;

Clark, 174; Emery, 287; Heald,

423; Heald and Mather, 425;

Hopkins, 454; Lloyd and

Mather, 579; Ross, 807.

Petroleum: Burton, 134.

Osage Reservation: Bowen, 89, 90,

91; Clark, 174; Emery, 287;

Heald, 423; Heald and

Mather, 425; Hopkins, 454;

Lloyd and Mather, 579; Ross,

807; White, 1031; Winchester

et al., 1067.

Tripoli deposits: Perry, 752.

Dynamic and structural.

Osage Reservation, structure: Emery, 287.

Travertine deposits, Arbuckle Mountains, Oklahoma: Emig, 289, 290.

Oklahoma—Continued.*Physiographic.*

General: Snider, 888.

Stratigraphic.

General: Snider, 888.

Borings: Aulin, 28.

Fort Scott-Boone interval: Berger, 64.

Oil sands, correlation: Aulin, 28.

Osage County: Greene, 363.

Osage Reservation: Bowen, 89, 90, 91;

Clark, 174; Emery, 287; Heald,

423; Heald and Mather, 425;

Hopkins, 454; Lloyd and

Mather, 579; Ross, 807; Win-

chester *et al.*, 1067.

Pawhuska quadrangle: Heald, 424.

Red beds: Aulin, 27; Ohern, 718.

Southern Oklahoma: Stephenson, 909.

Tertiary: Berry, 69.

Travertine deposits: Emig, 289.

Paleontology.

Tertiary plants: Berry, 69.

Ontario.*Economic.*

Copper, northwestern Ontario: Parsons, 746.

Sudbury: Roberts and Longyear, 792.

Gold, Benoit township: Burrows, 130.

Dryden area, district of Kenora: Thomson, 943.

Gauthier township: Burrows, 131.

Kowkash area: Hopkins, 455.

Long Lake mine: Baker, 34.

Matachewan area: Burrows, 132.

Rickard township: Hopkins, 456.

Iron, northwestern Ontario: Parsons, 746.

Rainy River district: Robinson, 797.

Kowkash gold area: Hopkins, 455.

Lake Abitibi area: Hopkins, 458.

Limestones: Frechette, 320.

Longueac to Jellicoe: Burrows, 129.

Matachewan gold area: Burrows, 132.

Mineral industry, 1917: Gibson, 333.

Molybdenite: Parsons, 744.

Northwestern Ontario: Parsons, 746.

Nickel, Alexo mine, Timiskaming district: Baker, 35.

Sudbury: Roberts and Longyear, 792.

Ogahalla to Collins, Northern Transcontinental Railway: Hopkins, 457.

Oil fields, development: Williams, 1051.

Oil prospecting, southwestern Ontario: Williams, 1052.

Report of Bureau of Mines, 1917: Gibson, 332.

Silver, Cobalt: Reid, 781.

Slate Islands, Lake Superior: Parsons, 745.

Sudbury district: Baker, 34.

Ontario—Continued.*Economic—Continued.*

Sudbury deposits, origin: Goodchild, 342.

Sudbury nickel-copper deposits: Roberts and Longyear, 791, 793.

Timiskaming district: Baker, 35.

Physiographic.

Ottawa beach of Champlain sea: Kindle, 517.

Stratigraphic.

Gauthier township: Burrows, 131.

Kowkash gold area: Hopkins, 455.

Lake Abitibi area: Hopkins, 458.

Longueac to Jellicoe: Burrows, 129.

Matachewan gold area: Burrows, 132.

Northwestern Ontario: Parsons, 746.

Ogahalla to Collins, Northern Transcontinental Railway: Hopkins, 457.

Slate Islands, Lake Superior: Parsons, 745.

Sudbury district: Baker, 34.

Timiskaming district: Baker, 35.

Toronto region: Coleman, 195.

Paleontology.

Devonian, Onondaga limestone: Stauffer, 903.

Mollusca, Mackay Lake, Ottawa: Whittaker, 1043.

Mineralogy.

Euxenite: Miller and Knight, 674.

Oolite.

Inorganic origin: Bucher, 116.

Origin: Bucher, 117.

in shale: Tarr, 933.

Siliceous oolites in shale: Tarr, 930.

Types of Paleozoic: Van Tuyl and Crooks, 978.

Ordovician.*Stratigraphy.*

General: Clarke, 181.

Alaska, Cosna-Nowitna region: Eakin, 275.

southeastern: Kirk, 520.

California, Inyo Range: Kirk, 519.

Georgia, Appalachian Valley: Shearer, 858.

Idaho, southeastern: Schultz, 833.

Illinois, Starved Rock State Park: Cady, 143.

Martinsburg shale: Hintze, 440.

Maryland, Piedmont Plateau: Bassler, 47, 48.

Missouri: Branson, 102.

barite districts: Tarr, 932.

Greene County: Shepard, 860.

New York, Cliff Haven: Hudson, 464.

Ontario, Toronto region: Coleman, 195.

Pennsylvania, Blair and Huntingdon counties section: Butts, 142.

Quebec, Timiskaming County: Wilson, 1058.

Ordovician—Continued.**Stratigraphy—Continued.**

Saskatchewan, Amisk Lake district:
Bruce, 111.

South Dakota, Black Hills region:
Darton, 228.

Texas, trans-Pecos front range: Baker
and Bowman, 82.

Vermont, central: Richardson, 788.

Virginia, Buchanan County: Hinds,
439.

Piedmont Plateau: Bassler, 47, 48.

Wisconsin, southeastern: Alden, 8.

Wyoming, western: Schultz, 833;
Blackwelder, 76.

Paleontology.

Richmond fauna, Little Bay de No-
quette, Michigan: Foerste, 315.

**Ore deposits, origin. For ore deposits in
general see Economic (general).**

General: Boyd, 97; Emmons, 292;
Hastings, 408.

Fluorine in sericitization: Paige
and Steiger, 729.

Halogen salts of silver: Burgess,
125.

Lateritic ore deposits: Miller, 672.

Mechanics of vein formation: Taber,
927.

Pressure in formation of ore de-
posits: Taber, 925.

Sphalerite, relation to other sul-
phides in ores: Graton, 360;
Watson, 1002.

Vein formation: Taber, 927.

Barite, Missouri: Tarr, 932.

British Columbia, Telkwa district:
Dolmage, 260.

Carnotite deposits, origin: Notestein,
714.

Copper, California, Engels: Graton
and McLaughlin, 362.

Nevada, Yerington: Knopf, 528.

Oriente, Cuba: Emerson, 284.

Sudbury, Ontario: Roberts and
Longyear, 793.

Gold, deposition in nature: Lenher,
562.

In Canadian pre-Cambrian deposits:
Wallace, 989.

Manitoba, Wekusko Lake: Alcock,
7.

Saskatchewan, Amisk Lake dis-
trict: Bruce, 111.

Iron, Belcher Islands, Hudson Bay:
Moore, 693.

limonite, Mayaguez, Porto Rico:
Fettke and Hubbard, 310.

titanic ores: Warren, 994.

Lead and zinc, Missouri: Tarr, 929.

Magnetite, Valley, Washington: Jenk-
ins, 474.

Manganese, Virginia: Hewett *et al.*,
433.

Ore deposits—Continued.

Molybdenite, Pontiac County, Quebec:
Thomson, 944.

Montana, Garnet Range: Pardee, 738.

Ontario: Sudbury deposits: Good-
child, 342.

Sudbury nickel-copper ores: Roberts
and Longyear, 791.

Nevada, Clark County, Yellow Pine
district: Hale, 389.

Tonopah: Bastin and Laney, 51.

Nickel, Ontario, Timiskaming dis-
trict: Baker, 35.

Sudbury, Ontario: Roberts and
Longyear, 793.

Quicksilver, Arizona, Phoenix Moun-
tains: Schrader, 828.

California: Bradley, 98.

Silver, Cobalt, Ontario: Reid, 781.

halogen salts, occurrence: Lindgren,
572.

Nevada, Wonder: Young, 1087.

Silver halides, occurrence: Knopf, 534.

Sulphides, relation to water level in
Mexico: Lucke, 595.

Uranium-vanadium ores: Notestein,
714.

Utah, Tooele County: Kemp and
Billingsley, 503.

Zinc: Boyd, 97.

California, Inyo Range: Knopf, 527.

Colorado, Leadville: Loughlin, 590.

Joplin-Miami district: Buehler, 120.

New York, Edwards district: Smyth,
887.

Ore deposits of the Southwest: Tovote,
952.

Oregon.**General.**

Cascades: Smith, 885.

Economic.

Cascades: Smith, 884.

Manganese: Anon., 1097.

Lake Creek: Pardee and Parks, 742.

Nitrate deposits, southeastern Oregon:
Williams, 1048.

Physiographic.

Block faulting, Klamath lakes region:
Johnson, 480.

Columbia River gorge: Chaney, 166.

Wallowa Mountains: Smith, 886.

Stratigraphic.

General: Smith, 883.

Cascades: Smith, 884.

Columbia River gorge: Chaney, 166.

Franciscan sandstone: Davis, 230.

Oligocene: Clark and Arnold, 173.

Paleontology.

General: Smith, 883.

Eagle Creek flora, Columbia River
gorge: Chaney, 166.

Mineralogy.

Opal, fibrous form: Merrill, 663.

Ore shoots. *See* Economic geology; Ore de-
posits, origin.

Organic deposits of the sea : Vaughan, 977.

Orogeny.

- General : Barrell, 42 ; Thayer, 937.
- California, Inyo Range : Knopf, 527.
- Laccolithic intrusion, mechanics of : Keyes, 507.
- Laccolithic mountains, origin : Keyes, 511.

Oscillation. *See* Changes of level.

Paleobotany.

- Clathropteris : Berry, 72.
- Cycadeoid wood structure : Wieland, 1044.
- Cycadeoidea, floral structures : Wieland, 1047.
- Dakota sandstone, leaves : Gress, 371.
- Dicotyla, origin : Wieland, 1045.
- Eagle Creek flora, Columbia River gorge : Chaney, 166.
- Neocalamites, restoration : Berry, 71.
- Oklahoma, Plantae : Berry, 69.
- Oligocene plants, Montana : Jennings, 476.
- Panama Canal zone : Berry, 70.
- Stonewort, Jura-Cretaceous : Hannibal, 398.
- Vermejo and Raton floras : Knowlton, 535.
- Willows and poplars, history : Berry, 68.
- Wood replaced by calcite : Greenland, 364.

Paleoclimatology.

- General : Huntington, 466 ; Lull, 599 ; Schuchert, 827, 831.
- Alaska, sedimentary record of climate : Blackwelder, 77.
- Amelloration of climate : Manson, 620 ; Mather, 625.
- Devonian : Clarke, 184.
- Lacustral record of past climates : Keyes, 510.

Paleo-ecology : Clements, 188.

Paleogeography. *See also* Geologic history ; Paleoclimatology ; Paleogeographic maps.

- General : Lull, 599 ; Schuchert, 827.
- California, Tertiary : Clark and Arnold, 173.
- Chester series : Ulrich, 962.
- Missouri : Branson, 102.
- Ontario dome, influence on Tertiary drainage : Grabau, 351.

Paleontology (general). *See also the classes of animals and Paleobotany. For stratigraphic see the different systems. For regional see names of States. See also Evolution.*

- General : Mather, 628 ; Schuchert, 831 ; Washburne and Washburne, 993.
- Arrested evolution : Ruedemann, 808.
- Isolation a development factor : Grabau, 349.
- Missouri, index fossils : Branson, 102.
- Organic evolution : Lull, 597.
- Origin of life : Woodruff, 1076.
- Paleoecology : Clements, 188.
- Pathological conditions in fossils : Moodle, 686.
- Ring structures in silica : Stansfield, 901.

Vertebrae, evolution : Williston, 1053.

Paleontology of arrested evolution : Ruedemann, 808.

Paleozoic (undifferentiated).

- Alaska, Chitina Valley : Moffit, 683.
- Lake Clarke-central Kuskokwim region : Smith, 878.
- Arctic regions, Ellesmere and Grinnell lands : Holstedahl, 487.
- Cuba : Hayes, Vaughan, and Spencer, 421.
- Nevada, Reese River basin : Waring, 993.

Palladium.

General.

- Occurrence : Kunz, 541.
- Nevada, Clark County, Yellow Pine district : Hale, 389.

Panama Canal Zone.

Stratigraphic.

Tertiary, correlation : Vaughan, 979.

Paleontology.

- Bryozoa, Emperador limestone : Cann and Bassler, 153.
- Cirripedia : Pilsbry, 756.
- Decapod Crustacea : Rathbun, 774.
- Echini : Jackson, 468.
- Foraminifera : Cushman, 216, 217.
- Lithothamnaceae : Howe, 462.
- Plantae : Berry, 70.

Paragenesis of minerals.

British Columbia, Telikwa district : Dolmage, 260.

Pennsylvania.**Economic.**

Glass sands: Fettke, 306.

Pyrite in coal: Leighton, 558.

Uranium-vanadium ores, origin: Note-stein, 714.

Dynamic and structural.

Temperature in deep wells: Van Or-strand, 970.

Stratigraphic.

Blair and Huntingdon counties sec-tion: Butts, 142.

Boring, McDonald: White, 1033.

Boyetown Hills, eastern Pennsyl-vania: Jonas, 485.

Deep wells: White, 1036.

Martinsburg shale: Hintze, 440.

Pre-Cambrian and Triassic diabase, eastern Pennsylvania: Jonas, 485.

Pre-Cambrian sedimentary rocks in Highlands of eastern Pennsyl-vania: Wherry, 1028.

Paleontology.

Chemung sponges, Erie: Clarke, 183.

Cockroaches, Pennsylvanian: Cocke-rell, 189.

Rutiodon, York: Sinclair, 867.

Petrology.

Boyetown Hills, eastern Pennsylva-nia: Jonas, 485.

Pre-Cambrian sedimentary rocks in Highlands of eastern Pennsyl-vania: Wherry, 1028.

Mineralogy.

Limonite pseudomorphous after pyrite, Lancaster County: Willig, 1054.

Sylmar: Wherry, 1024.

Wavellite, Northampton County: Wherry, 1020.

Pennsylvanian. *See* Carboniferous.Pentremites. *See* Blastoides.

Periodic diastrophism, production of: Chamberlin, 164.

Permian. *See* Carboniferous.**Petroleum.**

General: Burton, 133; Gilbert and Pogue, 335; Northrop, 712; Ziegler, 1091.

Accumulation: Lewis, 570.

in salt domes: Jonas, 491.

Bibliography, 1915: Burroughs, 128.

Dip of marine limestone strata: Mather, 627.

Geology: Allen, 14; O'Hara, 717; Ziegler, 1088.

Migration: Ziegler, 1090.

through sedimentary rocks: Mc-Coy, 607.

Movement through rocks. *wash.***Petroleum—Continued.**

General: Oil field temperatures: De-Golyer, 244.

Oil fields, origin: van der Gracht, 966.

Oil prospects under western Lake Erie: Nattress, 706.

Origin: Coste, 208; Steidtmann, 906.

Petrology of reservoir rocks: Lewis, 570; Rogers, 802.

Pools, origin: Steidtmann, 906.

Popular oil geology: Ziegler, 1088.

Porosity of oil sands: Shaw, 852.

Porosity of rocks, relation to accu-mulation: Jones, 489.

Salt domes, origin: Dumble, 272.

Salt water, relation to accumula-tion: Johnson, 481.

Source and origin of salt dome oil: Lucas, 594.

Water surfaces in oil fields: Daly, 223.

Alberta, Peace River region: McLearn, 610.

Sheep River area: Slipper, 870.

Berea sand, Ohio, lithology: Panyity, 736.

Cuba: DeGolyer, 241.

Gulf region: Lucas, 594.

Illinois: Wheeler, 1018.

Kansas: Whitaker *et al.*, 1030.

Kentucky: Pemberton, 748; Thayer, 938.

Louisiana: Deussen, 251.

Gulf Coast country: Matteson, 684.

northern: Bates, 55.

Red River field: Bates, 54.

Mexico: Bustamante, 136; DeGolyer, 245.

Pacific coast: Palacios, 730.

Tamaulipas: Ordóñez, 721.

Mid-Continent field: Bloesch, 80.

Oklahoma: Bloesch, 80; Burton, 134.

age of oil in southern fields, Mat-teson, 635; Pratt, 765.

Osage Reservation: Bowen, 89, 90, 91; Clark, 174; Emery, 287;

Heald, 423; Heald and Mather, 425; Hopkins, 454; Lloyd and

Mather, 579; Ross, 807; White, 1081; Winchester *et al.*, 1067.

Pawhuska quadrangle: Heald, 424.

Ontario, southwestern: Williams, 1052.

Tennessee, Glenmary field: Glenn, 341.

Texas: Deussen, 251.

Gulf coast country: Matteson, 684.

north central: Hager, 388; Kem-

116 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1918.

- Petrology** (general). *See also* Igneous and volcanic rocks; Technique. *For regional see names of States.* *For rocks described, see list, p. 128.*
- Alkaline rocks, genesis: Daly, 225.
Chert, origin: Davis, 232.
Continental clastics, characteristics: Blackwelder, 74.
Dolomite, formation of: Skeats, 869.
Glass-making processes: Bowen, 93.
History: Pirsson, 757.
Lithogenesis: Grabau, 354.
Lopolith: Grout, 378.
Marine clastics, diagnostic characteristics: Kindle, 518.
Multiple rock diagrams: Grout, 383.
Sedimentary rocks, interpretation: Grabau, 354.
Serpentine, origin: Benson, 63.
Synthesis of rocks, experimental studies: Sosman, 890.
Volume changes in metamorphism: Lindgren, 576.
- Philosophy of geology and the order of the state:** Clarke, 182.
- Phosphate.**
General: Stone, 920.
Idaho, southeastern: Schultz, 833.
Origin of western phosphates: Mansfield, 618.
Utah, Uinta Mountains: Schultz, 834.
Wyoming, western: Schultz, 833.
- Phosphorus.**
General: Stone, 920.
- Physiographic** (general). *For regional, see under various States.* *See also* Drainage changes.
Appalachian peneplains, age: Shaw, 856.
Bibliography: Lobeck, 580.
Continental shelf, origin: Cotton, 209.
Desert deltas, rate of growth: Keyes, 506.
Desert depressions, origin: Hobbs, 442.
Geologic dates, use of: Rich, 785.
Idaho peneplain, age: Rich, 787.
Lacustral record of past climates: Keyes, 510.
Physiographic divisions of North America: Thayer, 937.
Progress of interpretation of land forms: Gregory, 367.
Rocky Mountains, southern, Mesozoic: Lee, 556.
Submarine banks: Davis, 234.
United States, geographic provinces: Jefferson, 472.
- Placoe.**
- Platinum**—Continued.
Canada: Malcolm, 616.
Nevada, Clark County, Yellow Pine district: Hale, 389.
Wyoming: Taft, 928.
- Pleistocene.** *See* Glacial geology: Quaternary.
- Pliocene.** *See* Tertiary.
- Polyzoa.** *See* Bryozoa.
- Popular oil geology: Ziegler, 1088.
Porosity of oil sands: Shaw, 852.
Portland cement. *See* Cement.
- Porto Rico.**
Economic.
Limonite deposits, Mayaguez Mesa: Fetteke and Hubbard, 310.
Dynamic and structural.
Changes of level, recent: Mitchell, 681.
Stratigraphic.
Coamo-Guayama region: Hodge, 443.
San Juan district: Semmes, 845.
Paleontology.
Iats: Anthony, 20.
Faunas: Reeds, 776.
Rodentia: Anthony, 19.
- Potash.**
General: Coolbaugh, 207.
California: Boalich and Castello, 84.
Canada: Malcolm, 616.
Georgia, Cartersville slates: Shearer, 858.
Nebraska: Condra, 203.
Saskatchewan: Dowling, 263.
- Potholes.**
General: Elston, 281.
- Pre-Cambrian.**
General.
Correlation and nomenclature in the St. Lawrence Basin: Wilson, 1060.
Stratigraphy.
Arizona, Jerome district: Finlay, 313.
British Columbia, Crownest and Flathead areas: Rose, 806.
California, Inyo Range: Kirk, 519.
Manitoba, Schist Lake district: Bruce, 113.
southeastern: Marshall, 621.
Wekusko Lake area: Alcock, 6.
Minnesota, east central: Harder and Johnston, 403.
Montana, northeastern: Collier, 200.
New York, Adirondack Mountains: Ailing, 16.
Gouverneur quadrangle: Cushing, 214.

Pre-Cambrian—Continued.

Stratigraphy—Continued.

Ontario, Long Lake district: Baker, 34; Burrows, 129.

Matachewan area: Burrows, 132.

Slate Islands: Parsons, 745.

Sudbury: Roberts and Longyear, 791.

Timiskaming district: Baker, 35.

Toronto region: Coleman, 195.

Pennsylvania, eastern: Jonas, 485.

sedimentary rocks: Wherry, 1028.

Quebec, Belcher Islands, Hudson Bay: Moore, 693.

Pontiac County: Thomson, 944.

Timiskaming County: Wilson, 1058.

Saskatchewan, Amisk Lake district: Bruce, 111.

Wisconsin, southeastern: Alden, 8.

Wyoming, Medicine Bow Range: Blackwelder and Crooks, 78.

Paleontology.

Atkokania lawsoni: Abbott, 1; Walcott, 987.

Precious stones.

General: Schaller, 822, 823.

Primates. *See* Mammalia.

Pseudomorphs.

Limonite after pyrite, Lancaster County, Pennsylvania: Willig, 1054.

Pyrite.

General: Smith, 879, 880.

Colorado, Leadville: Lee, 551.

Georgia: Shearer and Hull, 859.

Pennsylvania coals: Leighton, 558.

South Carolina, Kershaw: Watkins, 1001.

Tennessee, Ducktown: Taylor, 935.

Pyrrhotite.

Tennessee, Ducktown: Taylor, 935.

Virginia, southwestern: van Mater, 969.

Quaternary. *See also* Glacial geology.

General: Hay, 417.

Stratigraphy.

Alaska, Chitina Valley: Moffit, 683.

California, Inyo Range: Knopf, 527.

Idaho, southeastern: Schultz, 833.

Illinois, Starved Rock State Park: Cady, 143.

Kentucky, Shawneetown quadrangle: Lee, 552.

Lake Lahontan, age, mammalian evi-

Quaternary—Continued.

Paleontology.

California, Pleistocene, Hawver Cave: Stock, 917.

Illinois, postglacial Mollusca: Baker, 33.

Massachusetts, Boston: Shimer, 862.

Mexico, Lower California, Pleistocene Mollusca: Dall, 221.

Nevada, Reese River basin: Waring, 993.

Ontario, Mackay Lake, Mollusca: Whitaker, 1043.

Tapir, Pleistocene, Florida: Sellards, 840.

Quebec.

Economic.

General: Denis, 250.

Belcher Islands, Hudson Bay: Moore, 692, 693.

Iron, Belcher Islands, Hudson Bay: Moore, 692, 693.

Lead, Lemieux, Gaspé County: Mailholt, 615.

Lemieux, Gaspé County: Mailholt, 615.

Mining operations, 1917: Denis, 250.

Molybdenite, Pontiac County: Thomson, 944.

Quyon district: Wilson, 1059.

Timiskaming County: Wilson, 1058.

Zinc, Lemieux, Gaspé County: Mailholt, 615.

Dynamic and structural.

Vein systems in Percé rock: Clarke, 185.

Physiographic.

Timiskaming County: Wilson, 1058.

Stratigraphic.

Algal limestone, Belcher Islands: Moore, 694.

Belcher Islands, Hudson Bay: Moore, 693.

Black Lake area, Megantic County: Poitevin and Graham, 761.

Lemieux, Gaspé County: Mailholt, 615.

Molybdenite area, Pontiac County: Thomson, 944.

Timiskaming County: Wilson, 1058.

Mineralogy.

Black Lake area, Megantic County: Poitevin and Graham, 761.

Colerainite, origin: Poitevin, 760.

Quicksilver.

118 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1918.

Radium.

Colorado, southwestern: Kithll and Davis, 522.

Distribution of deposits: Moore, 698.

Utah, southeastern: Kithll and Davis, 522.

Rare earths.

General: Schaller, 821.

Raton Mesa region, Colorado-New Mexico: Lee, 554.

Red Beds, origin: Knight, 526.

Relief maps.

Idaho: Livingston, 578.

Lake Superior district: Harder and Johnston, 403.

Mexico: Bustamante, 136.

Reptilia.

Alligator, Tertiary: Matthew, 644.

Apotosaurus: Mook, 689.

Dinosaurs, sauropod, habitat: Mook, 691.

Diplodocus, fore and hind limbs: Mook, 690.

Edaphosaurus, Arch County, Texas: Case, 157.

Monoclonius, Red Deer River: Brown, 107.

Mosasaurs, diseases: Moodie, 685.

Permian: Williston, 1056.

Rutiodon, Triassic, Pennsylvania: Sinclair, 867.

Sauropoda, specific characters: Mook, 689.

Stegosaurus: Gilmore, 338; Lambe, 545.

Trachodon: Lambe, 543.

Restorations.

General: Washburne and Washburne, 995.

Clathropteris: Berry, 72.

Edaphosaurus, Archer County, Texas: Case, 157.

Megalocnus: Matthew, 643.

Monoclonius: Brown, 107.

Moropus: Matthew, 642.

Neocalamites: Berry, 71.

Stegosaurus: Gilmore, 338.

Rhode Island.

Stratigraphic.

Igneous rocks: Hawkins, 412.

Petrology.

Igneous rocks: Hawkins, 412.

Mineralogy.

Fibrous quartz: Hawkins, 411.

Quartz crystals, Centerdale: Hawkins, 410.

Rhythms: Barrell, 40.

Ripple mark: Kindle, 518.

Rocks, structural features. See also Ripple marks.

Anomalous dips: Shaw, 857.

Dolomitization, depth: Van Tuyl, 972.

Igneous rocks: Grout, 380.

Indices of dip in rocks: Logan, 583.

Marine clastics, diagnostic characteristics: Kindle, 518.

Mud-crack limestone, Devonian: Fenton, 308.

Oolites and spherulites: Bucher, 117.

Oolites in shale, origin: Tarr, 933.

Plastic deformation of Grenville limestone, Port Henry region: Newland, 708.

Porosity of oil sands: Shaw, 852.

Rhythmic banding of manganese dioride in rhyolite tuff: Tarr, 934.

Rock-boring animals, geologic significance: Barrows, 43.

Sorting of sedimentary rocks: Shaw, 849.

Strand markings, Portage group: Clarke, 184.

Styrolitic structure in Tennessee marble, origin: Gordon, 345.

Vein systems in Percé rock: Clarke, 185.

Rocks described. See list, p. 128.

Rocky Mountains, physiographic methods of correlation: Lee, 535.

St. Croix.

Paleontology.

Pleurodonte debooyi: Bartsch, 45.

Salines.

California, Death Valley: Young, 1086.

Salt.

General: Stone, 922.

Migration: Kindle, 516.

Separation from saline water and mud: Kindle, 516.

Salt deposits.

Origin: Grabau, 350.

Virginia, southwestern, origin: Thomas, 940.

Salt domes.

General: Hawkins, 413.

Accumulation of oil in salt domes: Jones, 491.

Cap rock, origin: DeGolyer, 246.

Origin: Dumble, 272; Matteson, 634; Thomas, 941.

Intrusive origin: Rogers, 803.

Volcanic origin theory: DeGolyer, 243.

Salvador.

Dynamic and structural.

Sand.

- Bibliography: Hopkins, 451.
- Manitoba, Swan River valley: Johnston, 484.
- Moulding sands: Cole, 193.

Sandstone.

- British Columbia: Parks, 743.
- Canada: Cole, 194.

Saltsburg sandstone: Brown, 110.

Santo Domingo.

Economic.

- Iron: Brinsmade, 105.

Stratigraphic.

- Yaqui Valley: Maury, 650.

Paleontology.

- General: Maury, 650.

Saskatchewan.

Economic.

- Amisk-Athapapuskow Lake district: Bruce, 111.
- Clay, southern Saskatchewan: Davis, 233.
- Gold, Amisk Lake district: Bruce, 111.
- Lignite, southern Saskatchewan: MacLean, 609.
- Potash: Dowling, 263.
- Southeastern Saskatchewan: Stansfield, 900.

Stratigraphic.

- Amisk-Athapapuskow Lake district: Bruce, 111.
- Southeastern Saskatchewan: Stansfield, 900.
- Southern Saskatchewan: MacLean, 609.

Petrology.

- Amisk-Athapapuskow Lake district: Bruce, 111.

Sedimentary rocks, interpretation: Grabau, 354.

Sedimentation. *See also* Conglomerates; Erosion.

- Chemical deposits of the sea: Vaughan, 977.
- Climatic types of sediments: Blackwelder, 74.
- Continental clastics, characteristics: Blackwelder, 74.
- Continental shelf, origin: Cotton, 209.
- Graptolite shales, depth at which formed: Grabau and O'Connell, 356.

Seismology—Continued.

Seismic and magnetic disturbances, relation: Hazard, 422.

Starting point of earthquake vibrations: Reid, 780.

Teleseismic registration: Jaggard and Romberg, 470.

Seismology in Mexico: Muñoz Lumbier, 704.

Selenium.

General: Umpleby, 964, 965.

Serpentine.

Origin: Benson, 63.

Shale.

Canada: Keele, 498.

Shale oil.

General: Mitchell, 682.

Shoal-water bottom samples: Vaughan *et al.*, 981.

Shore lines. *See also* Beaches; Terraces.

Criteria for determination: Fairchild, 298.

Maine, Pleistocene shore lines: Katz, 493.

Michigan: Leverett, 565.

New Hampshire, Pleistocene shore lines: Katz, 493.

Silica.

General: Katz, 495.

Silurian.

General: Grabau, 352.

Correlation, America and Europe: Grabau, 352.

Stratigraphy.

Arisaig series, Nova Scotia: McLearn, 611.

Canada, Hudson Bay region: Savage, 816.

Clinton, Anticosti section: Ulrich, 963.

New York: Chadwick, 158.

Michigan, northern Peninsula: Savage and Crooks, 818.

Missouri: Branson, 102.

Montana, Garnet Range: Pardee, 738.

New York: Chadwick, 159.

central: Taber, 926.

Northwest Territory, Great Slave Lake region: Cameron, 146.

Pennsylvania, Blair and Huntingdon counties section: Butts, 142.

Quebec, Timiskaming County: Willson,

Silver.

- General: McCaskey and Dunlop, 603.
 Halogen salts, occurrence: Lindgren, 572.
 Alaska: Martin, 623.
 British Columbia, Telkwa district: Dolmage, 260.
 California, Inyo Range: Knopf, 527.
 Central States: Dunlop and Butler, 274.
 Colorado: Henderson, 428.
 Eastern States: Hill, 436.
 Idaho: Gerry, 331.
 Nevada: Helkes, 427.
 Arabis district: Knopf, 529.
 Clark County, Yellow Pine district: Hale, 389.
 Tonopah: Bastin and Laney, 51.
 Wonder: Young, 1087.
 Ontario, Cobalt: Reid, 781.
 Quebec, Timiskaming County: Wilson, 1058.
 Utah: Helkes, 426.
 Washington: Gerry, 331.

Slate.

- General: Loughlin, 588.
 Georgia, Appalachian Valley: Shearer, 858.

Slides. *See* Landslides.

Soapstone.

- General: Diller, 258.

Soda.

- Mexico, Lake Texcoco: Flores, 314.

Sols.

- Wisconsin, Columbia Co.: Whitson, *et al.*, 1041.
 Jefferson County: Whitson *et al.*, 1040.
 north central: Whitson *et al.*, 1042.
 northeastern: Whitson *et al.*, 1039.
 Solifluction, northern Greenland: Ekblaw, 279.

South Carolina.*Economic.*

- Pyrite, Kershaw: Watkins, 1001.

Stratigraphic.

- Tertiary, correlation: Vaughan, 979.

Paleontology.

- Foraminifera, Coastal Plain: Cushman, 215.
 Mastodon: Loomis, 584.

South Dakota.*Economic.*

- Tungsten, Black Hills: Runner and Hartmann, 810.

Dynamic and structural.

- General: Darton, 227.

Stratigraphic.

- General: Darton, 227.
 Black Hills region: Darton, 228.

Paleontology.

- Alligator, Tertiary: Matthew, 644.
 Mastodon: Osborn, 726.

South Dakota—Continued.*Mineralogy.*

- Black Hills: Wherry, 1023.

Underground water.

- Black Hills region: Darton, 228.

Spherulites, origin: Bucher, 117.

Spongia.

- Devonian glass sponges: Clarke, 183.
 Starved Rock State Park, Illinois: Cady, 143.

Stegosaurus: Lambe, 545.

Stone.

- General: Loughlin, 587.

Minnesota: Bowles, 96.

Strata, depth and thickness, graphic method for determining: Palmer, 732.

Stratigraphic (general). *For regional, see names of States. See also the different systems.*

General: Schuchert, 831.

Coal seams, spore-exines of: Thieszen, 939.

Oil-bearing and oil-producing formations: Grabau, 347.

Rock-boring animals, geologic significance: Barrows, 43.

Correlation.

Alaska, southeastern, Mesozoic: Chapin, 167.

Antilles, Tertiary: Jones, 490.

Chester series: Ulrich, 962.

Colorado, Raton Mesa region: Lee, 554.

Cretaceous, Texas and Oklahoma: Stephenson, 909.

Eocene, Atlantic and Pacific: Dickerson, 254.

Gulf Coast formations: Matteson, 634.

Jackson and Vicksburg deposits, Alabama and Mississippi: Cooke, 205.

Mississippian formations, western Kentucky: Butts, 140.

New Mexico, Raton Mesa region: Lee, 554.

Oil-bearing and oil-producing formations: Grabau, 347.

Pacific coast: Smith, 884.

Pennsylvanian: Savage, 817.

Permo-Carboniferous: Case, 156.

Pre-Cambrian: Wilson, 1060.

Rocky Mountains, physiographic methods of correlation: Lee, 555.

San Lorenzo series, California: Clark, 172.

Sediments, character, use of: Blackwelder, 75.

Tertiary, Antilles: Jones, 490.

Tertiary, southeastern U. S., and Antillean region: Vaughan, 979.

Texas, Marathon Basin: Baker and Bowman, 32.

Stratigraphic (general)—Continued.

Tables of formations.

- Alabama: Hager, 387.
- Alaska, southeastern, Mesozoic: Chapin, 167.
- British Columbia, Vancouver area: Burwash, 135.
- Chester series: Ulrich, 962.
- Colorado: Ziegler, 1091.
- Raton Mesa region: Lee, 554.
- Cuba: Hayes, Vaughan, and Spencer, 421.
- Georgia, Appalachian Valley: Shearer, 858.
- Idaho, southeastern: Schultz, 833.
- Kansas: Moore and Haynes, 697.
- Missouri, Greene County: Shepard, 860.
- Montana, Birch Creek-Sun River region: Stebinger, 905.
- northeastern: Collier, 200.
- New Mexico, Raton Mesa region: Lee, 554.
- Ontario, Toronto region: Coleman, 195.
- South Dakota, Black Hills region: Darton, 228.
- Tennessee, eastern: Stose and Schrader, 923.
- western: Dunbar, 273.
- Tertiary, correlation: Vaughan, 979.
- Texas, Marathon Basin: Baker and Bowman, 32.
- Washington, Oligocene: Van Winkle, 974.
- Wyoming, Park County: Moody and Tallafarro, 688.
- Salt Creek oil field: Wegemann, 1010.
- western: Schultz, 833.

Strontium.

- General: Boalich and Castello, 84; Hill, 437; Meade, 651.
- California, Barstow: Knopf, 530.

Structural materials. *See* Building stone, Clay, etc.

Structure of Great Plains: Darton, 227.

Study and teaching. *See* Educational.

Styrolitic structure in marble, origin: Gordon, 344, 345.

Submarine banks: Davis, 234.

Subsidence. *See* Changes of level.

Subterranean water. *See* Underground water.

Sulphur.

- General: Smith, 879, 880.
- New Mexico, Jemez Canyon: Mansfield, 618a.
- Texas, trans-Pecos region: Thomas, 942.

Surveys.

- Florida: Sellards, 839.
- Government geologic surveys: Smith, 875.
- New Jersey, State geologist's report: Kimmel, 537.
- Texas, report, 1915: Stiles, 914.

Surveys—Continued.

- United States: Smith, 874.
- Washington, report, 1915-17: Wash. G. S., 1000.
- Wisconsin, report, 1916-18: Wis. G. S., 1068.

Tables. *See* Stratigraphic, Tables of formations.

Talo.

- General: Diller, 258.

Technique.

- Crystallized mineral specimens, developing: Grenzig, 370.
- Dip, projection of, graphic method: Palmer, 732.
- Field-work methods: Roark, 790.
- Measuring temperature in deep wells: Van Orstrand, 970.
- Multiple rock diagrams: Grout, 383.
- Preparation of a report: Van Ingen, 968.
- Strata, depth and thickness, graphic method for determining: Palmer, 732.
- Tests for metals in minerals: Fannett, 301.

Telkwa district, British Columbia: Dolmage, 260.

Tellurium.

- General: Umpleby, 964, 965.

Tennessee.

General.

- Cave deposits, composition: Glenn, 340.

Economic.

- Barite, Sweetwater district: Gordon, 343.
- Manganese, Bradley County: Pudeu, 771.
- east Tennessee: Stose and Schrader, 923.
- Petroleum, Glenmary field: Glenn, 341.
- Pyrite and pyrrhotite, Ducktown: Taylor, 935.

Dynamic and structural.

- Styrolitic structure in Tennessee marble, origin: Gordon, 344, 345.

Stratigraphic.

- Chester series: Ulrich, 962.
- Devonian, western Tennessee: Dunbar, 273.
- Glenmary oil field: Glenn, 341.
- Sweetwater district, east Tennessee: Gordon, 343.

Paleontology.

- Devonian, western Tennessee: Dunbar, 273.

Terraces.

- General: Fairchild, 298.
- Mississippi, northern and central, Pliocene: Shaw, 850.
- Ohio, Holmesville: Cole, 192.
- Wisconsin, Mississippi River: Martin, 624.

Tertiary.*General.*

Correlation: Osborn, 723.

Stratigraphy.

Alabama: Hager, 387.

Jackson and Vicksburg deposits: Cooke, 205.

Alaska, Nelchina-Susitna region: Chapin, 168.

Arctic regions, Ellesmere and Grinnell lands: Høltedahl, 447.

Barbados: Craig, 210.

British Columbia, Crownsnest and Flathead areas: Rose, 806.

Vancouver area: Burwash, 135.

California, Carrizo Creek beds: Dickerson, 253.

Inyo Range: Knopf, 527.

Sallinas Valley: English, 204.

San Lorenzo series: Clark, 172.

Colorado: Ziegler, 1001.

Raton Mesa region: Lee, 554.

Cuba: DeGolyer, 241; Hayes, Vaughan and Spencer, 421.

Eocene, correlation: Dickerson, 254.

Eocene deposits, geographic conditions: Harris, 406.

Florida, western: Sellards and Gunter, 842, 843.

Georgia, Claiborne and Jackson deposits: Cooke and Shearer, 206.

Gulf Coast formations: Matteson, 634.

Haiti: Jones, 490.

Idaho, southeastern: Schultz, 833.

Kansas: Moore and Haynes, 697. central: Perrine, 751.

Kentucky, Shawneetown quadrangle: Lee, 552.

Lafayette formation: Shaw, 850.

Lafayette gravel: Shaw, 855.

Maryland, Anne Arundel County: Little, 577.

Meganos group, Eocene, California: Clark, 171.

Mexico, Tampico embayment area: Dumble, 271.

Mississippi, Jackson and Vicksburg deposits: Cooke, 205.

Montana, Birch Creek-Sun River region: Stebinger, 905.

Garnet Range: Pardee, 738.

Lake Basin field: Hancock, 395.

Musselshell Valley: Bowen, 92.

northeastern: Collier, 200; Collier and Thom, 201.

Nevada, Reese River basin: Waring, 993.

Yerlington district: Knopf, 528.

New Mexico, Raton Mesa region: Lee, 554.

North Dakota, Killdeer Mountains: Quirk, 772.

Nesson anticline, Williams County: Collier, 199.

Oklahoma: Berry, 69.

Oligocene, Pacific coast: Clark and Arnold, 173.

Tertiary—Continued.*Stratigraphy—Continued.*

Oregon, Cascades: Smith, 884.

Porto Rico, Coamo-Guayama region: Hodge, 443.

San Juan district: Semmes, 845.

Santo Domingo: Maury, 850.

Saskatchewan, southern: Davis, 233.

South Dakota, Black Hills region: Darton, 228.

Texas, northeastern: Stephenson, 909.

Utah, Morgan County, Lost Creek field: Clark, 175.

Washington, Oligocene: Van Winkle, 974.

Quincy Valley: Schwennessen and Melner, 837.

Wyoming, Hanna Basin: Bowen, 88.

Park County: Moody and Talin-ferro, 688.

Salt Creek oil field: Wagemann, 1010.

western: Schultz, 833.

Paleontology.

California, San Lorenzo series: Clark, 172.

Carrizo Creek fauna, California: Dickerson, 253.

Colorado, Paleocene bat: Matthew, 639.

Raton flora: Knowlton, 535.

San Juan Basin: Granger, 537.

Costa Rica, Bryozoa: Canu and Bassler, 153.

Eagle Creek flora, Columbia River gorge: Chaney, 166.

Equidae, revision: Osborn, 723.

Florida, Volusia County, Mollusca: Mansfield, 619.

Foraminifera, Coastal Plain: Cushman, 215.

Georgia, Claiborne and Jackson deposits: Cooke and Shearer, 206.

Idaho formation fauna: Merriam, 661.

Meganos group, Eocene, California: Clark, 171.

Montana, northeastern: Collier and Thom, 201.

New Mexico, Raton flora: Knowlton, 535.

San Juan Basin: Granger, 537.

Oklahoma, Plantae: Berry, 69.

Panama Canal Zone, Bryozoa: Canu and Bassler, 153.

Foraminifera: Cushman, 216.

Porto Rico: Reeda, 776.

Washington, Oligocene: Van Winkle, 974.

Wyoming, Notharctus: Granger and Gregory, 359.

Texas.*General.*

Geological mapping: Udden, 958.

Survey report, 1915: Stiles, 914.

Texas—Continued.

Economic.

- Coal, Webb County: Ashley, 24.
- Colorado coal field: Drake, 266.
- Glass Mountains: Udden, 959.
- Manganese, Shumla: Roberts and Nash, 794.
- Oil fields, north central Texas: Hager, 388.
- Oil pools, Gulf Coast country: Matteson, 634.
- Oil possibilities, Wise County: Böse, 85.
- Petroleum: Deussen, 251.
- north-central Texas: Kempfer, 504.
- Runnels County: Beede and Walte, 59.
- Salt domes, origin: Dumble, 272; Rogers, 803.
- Salt dome structure: Lucas, 504.
- Santo Tomas canal coal, Webb County: Ashley, 24.
- Sulphur, trans-Pecos region: Thomas, 942.
- Thrall oil field: Udden, 960.
- Val Verde County: Roberts and Nash, 794.

Dynamic and structural.

- Caves: Bailey, 31.
- North central Texas: Hager, 388.
- Salt domes, origin: Dumble, 272.
- Trans-Pecos Texas, front range: Baker and Bowman, 32.
- Wise County, Bridgeport and Chico: Böse, 85.

Physiographic.

- Camp Bowie area: Shuler, 864.
- San Antonio region: Stephenson, 908.
- Trans-Pecos Texas, front range: Baker and Bowman, 32.

Stratigraphic.

- Camp Bowie area: Shuler, 864.
- Colorado coal field: Drake, 266.
- Glass Mountains: Udden, 959.
- Llano series, age: Farrell, 40.
- North central Texas: Hager, 388; Kempfer, 504.
- Northeastern Texas: Stephenson, 900.
- Oil fields, north central Texas: Hager, 388.
- Oil pools, Gulf coast country: Matteson, 634.
- Runnels County: Beede and Walte, 59.

Texas—Continued.

Mineralogy.

- Meteorites, Fayette County: Merrill, 665.
- Plainview: Merrill, 664.
- Underground water.*
- San Antonio area: Muir, 700.
- Val Verde County: Roberts and Nash, 794.

Textbooks.

- Crystallography: Butler, 139.
- Economic geology: Emmons, 292.
- Geometrical crystallography: Butler, 138.
- Military geology and topography: Gregory, *et al.*, 368.
- Mineralogy: Butler, 139.
- Organic evolution: Lull, 597.

Tin.

- General: Boalich and Castello, 84; Knopf, 532, 533.
- Virginia, Irish Creek: Ferguson, 304, 305, 306.

Tintic district, Utah: Tibby, 946.

Titanic iron ores, microstructure: Warren, 994.

Travertine deposits, Arbuckle Mountains, Oklahoma: Emig, 289, 290.

Triassic.

Stratigraphy.

- Alaska, Chitina Valley: Moffit, 683.
- Gravina and Revillagigedo Islands: Chapin, 167.
- Nelchina-Susitna region: Chapin, 168.
- Alberta, Peace River section: McLearn, 610.
- Arctic regions, Ellesmere and Grinnell lands: Høltedahl, 447.
- British Columbia, Vancouver area: Burwash, 135.
- California, Inyo Range: Kirk, 519.
- Idaho, southeastern: Schultz, 833.
- Montana, southwestern: Condit, 202.
- Nevada, Yerington district: Knopf, 528.
- Pennsylvania, eastern: Jonas, 485.
- South Dakota, Black Hills region: Darton, 228.
- Utah, Green River desert: Emery, 288.
- Wyoming, western: Condit, 202; Schultz, 833.

Tungsten.

General: Runner and Hartmann, 810.

Bibliography: Hartmann, 407.

Ores: Anon., 1092.

Alaska, Fairbanks: Bateman, 52.

California: Boalich and Castello, 83.

Canada: Malcolm, 616.

Manitoba, Falcon Lake: DeLury, 249.

South Dakota, Black Hills: Runner and Hartmann, 810.

Turtles. *See* Reptilia.

Unconformities.

Cretaceous-Tertiary: Lee, 554.

Dip of marine limestone strata: Mather, 627.

Underground water (general). *See also* Geysers; Mineral waters; Springs; Thermal waters. *For regional see names of States.*

Bibliography: Meinzer, 635.

Water table, oscillations: Emmons, 293.

Uranium.

General: Cahen, 144.

Ungulata. *See* Mammalia.

Upper Silurian. *See* Silurian.

Utah.*Economic.*

Carnotite deposits, southwestern Utah: Kithil and Davis, 522.

Coal, Lost Creek field, Morgan County: Clark, 175.

Copper, Tooele County: Kemp and Billingsley, 503.

Gold, silver, copper, lead, and zinc in 1916: Helkes, 426.

Good Hill area, Tooele County: Kemp and Billingsley, 503.

Oil shales: Adkinson, 4; Ziegler, 1089.

Uinta Basin: Winchester, 1065.

Phosphate, Uinta Mountains: Schultz, 834.

Tintic district, Utah: Tibby, 946.

Uranium-vanadium ores, origin: Note-stein, 714.

Dynamic and structural.

Uinta Mountains, structure: Schultz, 834.

Valley City graben: Duke, 219.

Physiographic.

Lake Bonneville, age: Keyes, 510.

Valley City graben: Dake, 219.

Stratigraphic.

Green River Desert section: Emery, 288.

Lost Creek coal field, Morgan County: Clark, 175.

Santaquin and Mount Nebo region: Loughlin, 589.

Uinta Basin: Winchester, 1065.

Uinta Mountains: Schultz, 834.

Valley City area, Grand County: Dake, 219.

Paleontology.

Artiodactyla, Uinta Basin: Peterson, 753.

Utah—Continued.*Petrology.*

Gold Hill area, Tooele County: Kemp and Billingsley, 503.

Lamprophyre dikes, Santaquin and Mount Nebo region, Loughlin, 589.

Mineralogy.

Mimetite: Wherry, 1020.

Racewinite, Bingham: Winchell, 1061.

Tungstenite, Little Cottonwood district: Kuhre, 539; Wells, 1014.

Vanadium.

General: Boalich and Castello, 83.

Source of vanadium in sedimentary rocks: Phillips, 754.

Veins.

Formation, New York: Taber, 926.

Vermont.*Economic.*

Manganese, South Wallingford: Jones, 488.

Stratigraphic.

Cuttingsville: Eggleston, 277.

Glaciation, Wilmington area: Hubbard, 463.

Ordovician, central Vermont: Richardson, 788.

Petrology.

Eruptive rocks, Cuttingsville: Eggleston, 277.

Vertebrae, evolution: Williston, 1055.

Vertebrata (general). *See also* Amphibia; Aves; Mammalia; Pisces; Reptilia.

Nomenclature of cranial elements in Permian Tetrapoda: Gregory, 369.

Alberta: Sternberg, 911.

Montana, northeastern: Collier and Thom, 201.

Vertebrate paleontology, development: Lull, 601.

Virginia.*Economic.*

Coal, Buchanan County: Hinds, 439.

Copper, southwestern Virginia: Hancey, 396.

Emery: Watson and Steiger, 1008.

Manganese, Frederick County: Hancey, 397.

Shenandoah Valley: Hewett *et al.*, 433.

Pyrrhotite, southwestern Virginia: Van Mater, 969.

Salt deposits, southwestern Virginia, origin: Thomas, 940.

Tin, Irish Creek: Ferguson, 304, 305, 306.

Titanic iron ores, microstructure: Warren, 994.

Dynamic and structural.

Earthquake, April 9, 1918: Watson, 1006.

Virginia—Continued.

Physiographic.

- Camp Lee region: Giles, 336.
- Eastern Virginia: Giles, 336.
- Langley field, Hampton quadrangle, Virginia: Stephenson, 907.

Stratigraphic.

- Buchanan County: Hinds, 439.
- Irish Creek: Ferguson, 306.
- Ordovician, Piedmont: Bassler, 47, 48.
- Rock emery area, Pittsylvania County: Watson and Steiger, 1008.
- Rockbridge County, Irish Creek: Ferguson, 304.

Petrology.

- Spinellite: Watson and Steiger, 1008.

Mineralogy.

- Amelia Court House: Gordon, 346.
- Pyrolusite, Shenandoah Co.: Watson, 1005.

Volcanic rocks. *See* Igneous and volcanic rocks.

Volcanism.

- Eruption centers, regularity of intervals: Friedlaender, 322.

Volcanoes.

- General: Anderson, 18; Jagger, 469.
- Alaska: Dall, 220.
- Katmai, eruption: Griggs, 372, 373.
- Ten Thousand Smokes: Griggs, 374.
- hot mud flow: Griggs, 375.
- California, Lassen Peak: Sapper, 815.
- Guatemala: Sapper, 814.
- Hawaii: Jagger, 469.

- Kilauea, model: Daly, 224; Sayles, 819.

- Irazú, Costa Rica, eruptions, 1917-18: Calvert, 145.

- Quetzaltepeque, San Salvador, eruption: Lacroix, 542.

- San Salvador, eruption, June, 1917: Friedlaender, 323; Powers, 763.

War minerals: Leith, 560; Spurr, 898.

War work, geological: Meinzer, 654; Smith, 881.

Washington.

General.

- Survey report, 1915-17: Wash. G. S., 1000.

Economic.

- Colville Indian Reservation: Pardee, 741.
- Epsomite lake: Jenkins, 475.
- Gold, silver, copper, lead, and zinc, 1916: Gerry, 331.
- Magnesite: Stone, 918, 919.
- Magnesite Valley: Jenkins, 474.
- Manganese, northern Washington: Jenkins, 473.

Washington—Continued.

Physiographic—Continued.

- Colville Indian Reservation: Pardee, 741.

- Columbia River gorge: Chaney, 166.

- Epsomite lake: Jenkins, 475.

- Mount Rainier National Park: Matthes, 636.

- Western Washington: Leighton, 559.

Stratigraphic.

- Big Bend region: Meinzer, 656.

- Columbia River gorge: Chaney, 166.

- Colville Indian Reservation: Pardee, 741.

- Franciscan sandstone: Davis, 230.

- Oligocene: Clark and Arnold, 173; Van Winkle, 974.

- Oligocene paleogeography: Weaver, 1009.

- Porter Creek beds: Van Winkle, 975.

- Quincy Valley: Schwennesen and Meinzer, 837.

Paleontology.

- Eagle Creek flora, Columbia River gorge: Chaney, 166.

- Oligocene: Van Winkle, 974.

- Porter Creek beds: Van Winkle, 975.

Underground water.

- Quincy Valley: Schwennesen and Meinzer, 837.

Water surfaces in oil fields: Daly, 223.

Well records. *See* borings.

West Indies (general). *See also names of islands.*

Stratigraphic.

- Tertiary, correlation: Vaughan, 979.

West Virginia.

Economic.

- Barbour County: Reger and Teets, 778.

- Geologic map: White *et al.*, 1037.

- Natural gas: White, 1032.

- Petroleum: White, 1032.

- Randolph County, western part: Reger and Teets, 778.

- Upshur County: Reger and Teets, 778.

Dynamic and structural.

- Kanawha black flint: Price, 768.

- Temperature in deep wells: Van Orstrand, 970.

Stratigraphic.

- Barbour County: Reger and Teets, 778.

- Boring, Clarksburg, Harrison County: White, 1033.

- Deep wells: White, 1036.

- Geologic map: White *et al.*, 1037.

- Randolph County, western part: Reger and Teets, 778.

- Upshur County: Reger and Teets, 778.

Paleontology.

See also names of faunas.

Wind work—Continued.

Louisiana loess, origin: Emerson, 286.
 North Dakota, valley filling: Collier, 198.

Wisconsin.*General.*

Soils, Columbia Co.: Whitson *et al.*, 1041.

Jefferson County: Whitson *et al.*, 1040.

northeastern Wisconsin: Whitson *et al.*, 1030.

north central Wisconsin: Whitson *et al.*, 1042.

Survey report, 1916-18: Wis. G. S., 1068.

Physiographic.

Southeastern Wisconsin: Alden, 8.

Terraces, Mississippi River: Martin, 624.

Stratigraphic.

Quaternary geology, southeastern Wisconsin: Alden, 8.

Southeastern Wisconsin: Alden, 8.

Mineralogy.

Fluorite in Ordovician limestones: Bagg, 29.

Fluorspar in Ordovician limestone, Neenah: Bagg, 30.

Wood replaced by calcite: Greenland, 364.

Wyoming.*General.*

Bibliography: Bovee, 86.

Economic.

Cretaceous oil and gas fields: Trumbull, 955.

Petroleum, Salt Creek field: Wegemann, 1010.

Phosphate and coal, western Wyoming: Schultz, 833.

Platinum: Taft, 928.

Titanic iron ores, microstructure: Warren, 994.

Western Wyoming: Schultz, 833.

Dynamic and structural.

General: Darton, 227.

Hart Mountain overthrust, Park County: Dake, 218.

Stratigraphic.

General: Darton, 227.

Amsden formation, Wind River Mountains: Branson and Greger, 103.

Wyoming—Continued.*Stratigraphic—Continued.*

Hanna Basin: Bowen, 88.

Medicine Bow Range: Blackwelder and Crooks, 78.

Morrison formation, age: Schuchert, 830.

Oolites, Wind River Mountains: Tarr, 933.

Park County: Dake, 218.

Salt Creek oil field: Wegemann, 1010.

Sunshine, Park County, anticlines: Moody and Tallaferra, 688.

Western Wyoming: Blackwelder, 76; Condit, 202; Schultz, 832.

Paleontology.

Amsden formation, Wind River Mountains: Branson and Greger, 103.

Diatryma, Bighorn Basin: Matthew and Granger, 648.

Notharctus: Granger and Gregory, 359.

Stegosaurus: Gilmore, 338.

Yukon.*Economic.*

Gold, Sixtymile and Ladue valleys: Cockfield, 191.

Sixtymile and Ladue valleys: Cockfield, 191.

Stratigraphic.

Sixtymile and Ladue valleys: Cockfield, 191.

Zinc.

California, Inyo Range: Knopf, 527.

Central States: Dunlop and Butler, 274.

Colorado: Henderson, 428.

Leadville: Loughlin, 590.

Eastern States: Hill, 436.

Idaho: Gerry, 331.

Missouri-Kansas-Oklahoma zinc district: Wright, 1078.

Nevada: Helkes, 427.

Clark County, Yellow Pine district: Hale, 389.

New York, St. Lawrence County, Edwards district: Smyth, 887.

Quebec, Gaspé County, Lemieux: Malliot, 615.

Utah: Helkes, 426.

Washington: Gerry, 331.

Zircon.

General: Schaller, 821.

LISTS.

(The numbers refer to entries in the bibliography.)

CHEMICAL ANALYSES.

- | | |
|---------------------------------|---------------------------|
| Absarokite, 589. | Loess, 606, 850. |
| Algae, 977. | Magnetite, 994. |
| Alluvium, 850. | Mine waters, 51. |
| Amadorose, 135. | Miaskose, 277. |
| Andose, 277. | Minette, 412. |
| Arkose, 412. | Mullanite, 846. |
| Augite syenite, 277. | Nordmarkose, 277. |
| Barkevikite, 277. | Novaculite, 32. |
| Beerbachose, 135. | Olivine gabbro, 596. |
| Beryl, 1069. | Oolite, 977. |
| Blindheimite, 529. | Ouralite porphyry, 596. |
| Blotite granite, 412. | Peridotite, 310, 761. |
| Bottom deposits, 977. | Petroleum, 606. |
| Cassiterite, 306. | Phlegrose, 277. |
| Cave deposits, 340. | Phosphate rock, 833, 834. |
| Chromite, 761. | Plumbojarosite, 590. |
| Clay, 233. | Pseudo-diorite, 412. |
| Coal, 24, 175, 439, 833. | Pulaskite, 277. |
| Coleralinite, 761. | Pulaskose, 277. |
| Corallinaceae, 977. | Pyrolusite, 1005. |
| Diabase, 412, 761. | Pyroxene, 528. |
| Diopside, 761. | Pyroxenite, 761. |
| Dolomite, 343, 932. | Quartz, fibrous, 411. |
| Emery, 1008. | Quartz diorite, 135. |
| Essexite, 277. | Quartz keratophyre, 596. |
| Euxenite, 674. | Quartz monzonite, 527. |
| Felsite, 528. | Racewalite, 1061. |
| Foraminifera, 977. | Rhyolite, 528. |
| Gabbro, 377, 382, 412, 596. | Rubellite, 1069. |
| Garnetite, 528. | Schist, 412. |
| Granite, 412, 527. | Serpentine, 761. |
| Granite aplite-pegmatite, 1008. | Serpentine rock, 310. |
| Graphite ore, 16. | Shale, 412, 606. |
| Grossularite, 761. | Slate, 858. |
| Hematite, 1069. | Spinel, 1008. |
| Hetaerolite, 590. | Stichtite, 761. |
| Hornblende, 277. | Strontianite rock, 530. |
| Ilmenite, 994. | Sudbury ores, 791. |
| Ivalte, 847. | Syenite, 277. |
| Invertebrate skeletons, 977. | Tingualite, 277. |
| Iron ore, 710, 797. | Tripoli, 752. |
| Keratophyre, 528, 596. | Tungstenite, 538. |
| Kersantite, 589. | Vesuvianite, 761. |
| Lamprophyre, 589. | Vivianite, 1007. |
| Laterites, 672. | Washingtonite, 994. |
| Laurvikose, 277. | Wernerite, 1069. |
| Lava, 528. | Wolframite, 306. |
| Limestone, 213, 528. | Zinciferous clay, 590. |
| Limonite ore, 310. | Zoisite, 1069. |
| Litchfieldite, 226. | |

MINERALS DESCRIBED.

Alabandite, 15.
 Amphibole, 761.
 Apatite, 96, 761.
 Aragonite, 761.
 Argentite, 51.
 Argyrodite, 51.
 Arsenopyrite, 51, 848.
 Augite, 96.
 Aurichalcite, 590.
 Beryl, 444, 546, 1069.
 Braunite, 15, 923.
 Brucite, 761, 799.
 Calamine, 590.
 Calcite, 96, 590, 761.
 Cerussite, 550, 945.
 Cervantite, 848.
 Chalcophanite, 590.
 Chalcopyrite, 51, 761.
 Chalmersite, 478.
 Chlorite, 96.
 Chromite, 761.
 Chrysotile, 761.
 Clinocllore, 761.
 Colemanite, 318.
 Colerainite, 316, 760, 761.
 Collbranite, 316.
 Copiapite, 605.
 Cristobalite, 798.
 Cronstedtite, 441.
 Diamond, 761.
 Diopside, 761.
 Dolomite, 96, 761.
 Electrum, 51.
 Epidote, 96.
 Epsomite, 475.
 Euxenite, 674.
 Feldspar, 96.
 Fluorspar, 30.
 Gageite, 569.
 Galena, 51.
 Garnet, 96, 761.
 Gilpinite, 316.
 Grossularite, 761.
 Hematite, 96, 1069.
 Hetaerolite, 590.
 Hornblende, 96.
 Hydromagnesite, 761.
 Hydrozincite, 590.
 Ilmenite, 994.
 Ilvaite, 847.
 Kaolinite, 96.
 Kermesite, 848.

Kieserite, 475.
 Lazulite, 667.
 Limonite, 96.
 Magnetite, 96, 761, 994.
 Manganese, 923.
 Manganite, 15.
 Marcasite, 96.
 Mica, 96.
 Mimettite, 1020.
 Molybdenite, 761.
 Mullanite, 316, 846.
 Olivine, 96.
 Opal, 663.
 Ferriolase, 799.
 Picrolite, 761.
 Plumboparosite, 590.
 Polybasite, 51.
 Porcellophite, 761.
 Psilomelane, 15, 923.
 Pyrrargyrite, 51.
 Pyrite, 51, 96, 539, 848.
 Pyrolusite, 15, 923, 1005.
 Quartz, 96, 761.
 Quartz, fibrous, 411.
 Racewinite, 1061.
 Rhodochrosite, 15, 923.
 Rhodonite, 15.
 Rubellite, 1069.
 Scolecite, 761.
 Serpentine, 310, 761.
 Smithsonite, 590.
 Sphalerite, 51, 848.
 Tourmaline, 549, 761, 967.
 Spheue, 96.
 Stibioferrite, 848.
 Stibnite, 848.
 Stichtite, 761.
 Strontianite, 530.
 Talc, 96.
 Thaumassite, 1020.
 Tungstenite, 316, 538, 1014.
 Ulexite, 818.
 Valentinite, 848.
 Vesuvianite, 761.
 Vivianite, 1004, 1007.
 Volgerite, 848.
 Wad, 15, 923.
 Wavellite, 1020.
 Wernerite, 1069.
 Wolframite, 51.
 Zircon, 96, 761.
 Zoisite, 1069.

ROCKS DESCRIBED.

Andesite, 741.
 Andesite porphyry, 788.

Essexite, 277.
 Gabbro, 17, 96, 485, 596, 741, 761.

Olivine gabbro, 596.
 Ouralite porphyry, 596.
 Pegmatite, 17.
 Peridotite, 761.
 Phonolite, 17.
 Porphyrite, 761.
 Porphyry, 741.
 Pulaskite, 277.
 Pyroxenite, 761.
 Quartz diorite, 135.
 Quartz keratophyre, 596.

Quartz monzonite, 527.
 Quartz porphyry, 783.
 Rhyolite, 17, 527.
 Sandstone, 96.
 Schist, 17, 783.
 Serpentine, 741, 761.
 Syenite, 17, 96, 277.
 Tinguaita, 277.
 Trachydolerite, 17.
 Trachyte, 17.
 Tuff, 17.

GEOLOGIC FORMATIONS DESCRIBED.

Abilene conglomerate member, Permian, Kansas: Moore and Haynes, 697.
 Abitibi group, pre-Cambrian, Quebec: Wilson, 1058.
 Adams Branch limestone, Carboniferous, Texas: Drake, 266.
 Adaville formation (?), Cretaceous, Wyoming: Schultz, 833.
 Admiralty till, Pleistocene, British Columbia: Burwash, 135.
 Admire shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
 Agawa formation, pre-Cambrian, Minnesota: Harder and Johnston, 403.
 Alazan shales, Eocene, Mexico: Dumble, 271.
 Albany division, Carboniferous, Texas: Drake, 266.
 Allegheny formation, Pennsylvanian, Maryland: Clark *et al.*, 179.
 Allegheny formation, Pennsylvanian, Pennsylvania: Butts, 142.
 Allegheny series, Pennsylvanian, West Virginia: Reger and Teets, 778.
 Almy formation, Tertiary, Wyoming and Idaho: Schultz, 833.
 Altamont limestone, Oklahoma: Cullen, 213.
 Altamont limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
 Alum Bluff formation, Miocene, Florida: Sellards and Gunter, 842.
 Americus limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
 Ames limestone and shale, Pennsylvanian, West Virginia: Reger and Teets, 778.
 Amisk group, pre-Cambrian, Manitoba: Bruce, 113.
 Amisk volcanics, pre-Cambrian, Saskatchewan: Bruce, 111.
 Amnicon formation, pre-Cambrian, Minnesota: Harder and Johnston, 403.
 Amsden formation, Carboniferous, Wyoming: Branson and Greger, 103; Condit, 202.
 Anguilla formation, Tertiary, West Indies: Vaughan, 979.
 Ankareh shale, Triassic, Wyoming and Idaho: Schultz, 833.
 Annabelle shale, Pennsylvanian, West Virginia: Reger and Teets, 778.
 Annona tongue, Cretaceous, Texas: Stephenson, 909.

Antelope Creek bed, Carboniferous, Texas: Drake, 266.
 Anticostian, Silurian, New York: Chadwick, 158.
 Antietam formation, Cambrian, Maryland: Clark *et al.*, 179.
 Apison shale, Cambrian, Georgia: Shearer, 858.
 Aquia formation, Tertiary, Maryland: Clark *et al.*, 179; Little, 577.
 Arbuckle limestone, Oklahoma: Cullen, 213.
 Arecibo formation, Tertiary, Porto Rico: Semmes, 845.
 Arisaig series, Silurian, Nova Scotia: McLearn, 611.
 Arnoldsburg sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
 Arroyo formation, Permian, Texas: Beede and Waite, 59.
 Arundel formation, Cretaceous, Maryland: Clark *et al.*, 179; Little, 577.
 Ashokan beds, Devonian, New York: Grabau, 355.
 Aspen formation, Cretaceous, Wyoming and Idaho: Schultz, 833.
 Austin chalk, Cretaceous, Texas: Stephenson, 909.
 Aux Vases sandstone, Mississippian, Illinois: Ulrich, 962.
 Avant limestone, Carboniferous, Oklahoma: Emery, 287; Cullen, 213; Greene, 363; Lloyd and Mather, 579.
 Axeman limestone, Canadian, Pennsylvania: Butts, 142.
 Bailey formation, Devonian, Missouri: Bronson, 102.
 Baltimore gneiss, pre-Cambrian, Maryland: Clark *et al.*, 179.
 Bandera shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
 Baraboo quartzite, pre-Cambrian, Wisconsin: Alden, 8.
 Barnwell formation, Eocene, Georgia: Cooke and Shearer, 206.
 Bartlesville sand, Pennsylvanian, Oklahoma: Greene, 363.
 Bashi formation, Tertiary, Alabama: Hager, 387.
 Bayfield group, pre-Cambrian, Minnesota: Harder and Johnston, 403.
 Bays sandstone, Ordovician, Virginia: Hinds, 439.

- Raytown limestone, Pennsylvanian, Missouri: Wilson, 1057.
- Bead Mountain bed, Carboniferous, Texas: Drake, 266.
- Bead Mountain formation, Permian, Texas: Beede and Waite, 59.
- Bear Branch member, Devonian, Tennessee: Dunbar, 273.
- Bear Creek shale, Silurian, New York: Chadwick, 158.
- Bearpaw formation, Cretaceous, Alberta: Allan, 12.
- Bearpaw shale, Cretaceous, Montana: Bowen, 92; Collier, 200; Hancock, 395; Stebinger, 915.
- Bear River formation, Cretaceous, Wyoming and Idaho: Schultz, 833.
- Beaver limestone, Cambrian, Georgia: Shearer, 858.
- Beaumont clay, Tertiary, Gulf coast: Mattoon, 684.
- Beckwith formation, Jurassic, Wyoming and Idaho: Schultz, 833.
- Beekhill formation, Silurian, Nova Scotia: McLearn, 611.
- Beekmantown limestone, Ordovician, Maryland: Clark, *et al.* 179.
- Bejucal limestones, Eocene (?), Cuba: DeGolyer, 241.
- Belcher series, pre-Cambrian, Belcher Islands, Canada: Moore, 693.
- Bellefont dolomite, Canadian, Pennsylvania: Butts, 142.
- Belly River series, Cretaceous, Alberta: Allan, 12.
- Belt series, Algonkian, Montana: Pardee, 738.
- Bend formation, Mississippian, Texas: Kempher, 504.
- Bend series, Mississippian, Texas: Hager, 388.
- Bennington limestone, Oklahoma: Cullen, 213.
- Benton formation, Cretaceous, Colorado, New Mexico: Lee, 554.
- Benton formation, Cretaceous, Colorado: Ziegler, 1091.
- Benton formation, Cretaceous, Kansas: Moore and Haynes, 697.
- Benton group, Cretaceous, Kansas: Perrine, 751.
- Benton shale, Cretaceous, Wyoming: Wegmann, 1010.
- Benwood limestone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Bethany Falls limestone, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Bethany Falls limestone, Pennsylvanian, Missouri: McCourt, 606; Wilson, 1057.
- Bethel sandstone, Mississippian, Kentucky and Illinois: Butts, 140.
- Big Basin sandstone member, Permian, Kansas: Moore and Haynes, 697.
- Big Blue group, Permian, Kansas: Moore and Haynes, 697.
- Bigheart sandstone, Pennsylvanian, Oklahoma: Bowen, 89; Emery, 287; Hopkins, 454.
- Bighorn dolomite, Ordovician, Wyoming: Blackwelder, 76.
- Bighorn dolomite, Ordovician, Wyoming and Idaho: Schultz, 833.
- Big Valley beds, Carboniferous, Texas: Drake, 266.
- Bingen formation, Cretaceous, Arkansas: Miser and Purdue, 680.
- Birch Creek limestone, Pennsylvanian, Oklahoma: Bowen, 89.
- Birch Lake sandstone, Cretaceous, Alberta: Slipper, 871.
- Bird Creek limestone, Carboniferous, Oklahoma: Bowen, 91; Heald and Mather, 425.
- Birdsong formation, Devonian, Tennessee: Dunbar, 273.
- Birdsville formation, Mississippian, Illinois and Kentucky: Ulrich, 962.
- Birdsville group, Mississippian, Illinois and Kentucky: Ulrich, 962.
- Birmingham shale, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Biwabik formation, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Blackleaf sandy member, Cretaceous, Montana: Stebinger, 915.
- Blaine formation, Permian, Oklahoma: Aurlin, 27.
- Blossom sand, Cretaceous, Texas: Stephenson, 909.
- Bluff Creek bed, Carboniferous, Texas: Drake, 266.
- Bois d'Arc limestone, Oklahoma: Cullen, 213.
- Bolivar fire clay, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Bonita sandstone, Mesozoic, California: Davis, 230.
- Bonterre formation, Cambrian, Missouri: Branson, 102.
- Boone chert, Mississippian, Kansas and Oklahoma: Berger, 64.
- Boone formation, Oklahoma: Cullen, 213.
- Boone formation, Mississippian, Oklahoma: Perry, 752.
- Bosque division, Cretaceous, Texas: Drake, 266.
- Bowling Green limestone, Silurian, Missouri: Branson, 102.
- Brallier shale, Devonian, Pennsylvania: Butts, 142.
- Brandywine formation, Tertiary, Maryland: Clark *et al.*, 179.
- Brandywine formation, Tertiary (?), Maryland: Little, 577.
- Brazer limestone, Carboniferous, Wyoming and Idaho: Schultz, 833.
- Brewerton shale, Silurian, New York: Chadwick, 158.
- Brewster formation, Upper Cambrian, Texas: Baker and Bowman, 32.
- Bridgeport limestone, Carboniferous, Texas: Bsee, 85.

- Bridger formation, Tertiary, Utah: Winchester, 1066.
- Bright Angel formation, Cambrian, Arizona: Schuchert, 829.
- Britannia formation, Carboniferous, British Columbia: Burwash, 135.
- Brookhaven terrace deposits, Mississippi Valley: Shaw, 850.
- Brosseau formation, Cretaceous, Alberta: Allan, 12.
- Brown Creek bed, Carboniferous, Texas: Drake, 266.
- Brownstown marl, Cretaceous, Arkansas: Miser and Purdue, 680.
- Brownstown marl, Cretaceous, Texas: Stephenson, 909.
- Brownwood bed, Carboniferous, Texas: Drake, 266.
- Brule clay, Tertiary, South Dakota: Darton, 228.
- Brunswick conglomerate, Triassic, Pennsylvania: Jonas, 485.
- Brunswick shale, Triassic, Pennsylvania: Jonas, 485.
- Brush Creek limestone and shale, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Buck Point sandstone, Carboniferous, Oklahoma: Clark, 174.
- Buda limestone, Cretaceous, Texas: Roberts, 794.
- Buffalo sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Buffalo Creek bed, Carboniferous, Texas: Drake, 266.
- Buffalo Wallow formation, Mississippian, Kentucky and Illinois: Butts, 140.
- Bull Creek sandstone, Carboniferous, Texas: Drake, 266.
- Bull Creek limestone, Pennsylvanian, Oklahoma: Greene, 363.
- Bull Head Mountain sandstone, Cretaceous, Alberta: McLearn, 610.
- Bullwagon formation, Permian, Texas: Beede and Walte, 59.
- Bulwark sandstone, Cretaceous, Alberta: Slipper, 871.
- Burket black shale member, Devonian, Pennsylvania: Butts, 142.
- Burlingame limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Burlington limestone, Mississippian, Missouri: Branson, 102.
- Cahil sandstone, Mesozoic, California: Davis, 230.
- Calera limestone, Mesozoic, California: Davis, 230, 232.
- Calhoun shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Calloway limestone, Devonian, Missouri: Branson, 102.
- Calvert formation, Tertiary, Maryland: Clark *et al.*, 179; Little, 577.
- Camajuani formation, Cretaceous, Cuba: DeGolyer, 241.
- Camden chert, Devonian, Tennessee: Dunbar, 273.
- Camp Colorado bed, Carboniferous, Texas: Drake, 266.
- Camp Creek bed, Carboniferous, Texas: Drake, 266.
- Campito sandstone, Cambrian, California: Kirk, 519.
- Canton terrace deposits, Mississippi Valley: Shaw, 850.
- Canyon division, Carboniferous, Texas: Drake, 266.
- Canyon formation, Pennsylvanian, Texas: Kempfer, 504.
- Caprina limestone, Cretaceous, Texas: Drake, 266.
- Carbondale formation, Carboniferous, Illinois: Cady, 143.
- Carbondale formation, Pennsylvanian, Kentucky: Lee, 552.
- Cardiff quartzite, Ordovician (?), Maryland: Clark *et al.*, 179.
- Carlile shale, Cretaceous, Colorado: Ziegler, 1091.
- Carlile shale, Cretaceous, South Dakota: Darton, 228.
- Carlile shale, Cretaceous, Wyoming: Bowen, 88.
- Carlile shale member, Cretaceous, Kansas: Moore and Haynes, 697.
- Carlisle limestone, Ordovician, Pennsylvania: Butts, 142.
- Carolina gneiss, pre-Cambrian, Georgia: Shearer and Hull, 859.
- Cartersville formation, Cambrian, Georgia: Shearer, 858.
- Carterville formation, Mississippian, Missouri: Branson, 102.
- Caseyville sandstone, Pennsylvanian, Kentucky: Lee, 552.
- Cataboula sandstone, Tertiary, Gulf coast: Matteson, 634.
- "Catawba" (Monticelli) shale, Silurian.

- Cedar Hills sandstone member, Permian, Kansas: Moore and Haynes, 697.
- Cedarton bed, Carboniferous, Texas: Drake, 266.
- Cedartop gypsum member, Permian, Oklahoma: Aurin, 27.
- Cedarville sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Cement City limestone, Pennsylvanian, Missouri: McCourt, 606; Wilson, 1057.
- Chadron formation, Tertiary, South Dakota: Darton, 228.
- Chaffin bed, Carboniferous, Texas: Drake, 266.
- Chambersburg limestone, Ordovician, Maryland: Clark *et al.*, 179.
- Chaney gypsum member, Permian, Oklahoma: Aurin, 27.
- Chanute shale, Pennsylvanian, Missouri: McCourt, 606; Wilson, 1057.
- Chanute shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Chase formation, Permian, Kansas: Moore and Haynes, 697.
- Chattahoochee formation, Oligocene, Florida: Sellards and Gunter, 842.
- Chattanooga shale, Devonian, Tennessee: Dunbar, 273.
- Chattanooga shale, Devonian, and (?) Mississippian, Kentucky and Illinois: Butts, 140.
- Chemung formation, Devonian, Pennsylvania: Butts, 142.
- Chemung member, Devonian, Maryland: Clark *et al.*, 179.
- Chemung series, Devonian, West Virginia: Reger and Teets, 778.
- Chequamegon sandstone, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Cherokee formation, Pennsylvanian, Kansas and Oklahoma: Berger, 64.
- Cherokee formation, Pennsylvanian, Missouri: Wilson, 1057.
- Cherokee shale, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Cherokee shale, Pennsylvanian, Missouri: Branson, 102; McCourt, 606.
- Cherryvale shale, Pennsylvanian, Missouri: McCourt, 606; Wilson, 1057.
- Cherryvale shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Chesapeake group, Tertiary, Maryland: Clark *et al.*, 179.
- Cheshewalla sandstone, Pennsylvanian, Oklahoma: Winchester *et al.*, 1067.
- Chester group, Mississippian, Kentucky and Illinois: Butts, 140.
- Cheyenne sandstone, Comanchean, Kansas: Moore and Haynes, 697; Perrine, 751.
- Chickamauga formation, Ordovician, Georgia: Shearer, 858.
- Chickamauga limestone, Ordovician, Tennessee: Stose and Schrader, 923.
- Chico group, Cretaceous, California: English, 294.
- Chicotepec beds, Eocene, Mexico: Dumble, 271.
- Chimney Hill limestone, Oklahoma: Cullen, 213.
- Chinitna formation, Jurassic, Alaska: Chapin, 163.
- Chinle formation, Triassic, Utah: Emery, 288.
- Chittistone limestone, Triassic, Alaska: Moffitt, 683.
- Choctawhatchee formation, Miocene, Florida: Sellards and Gunter, 842.
- Choptank formation, Tertiary, Maryland: Clark *et al.*, 179; Little, 577.
- Chouteau limestone, Mississippian, Missouri: Branson, 102.
- Chozo formation, Permian, Texas: Beede and Waite, 59.
- Chugwater formation, Carboniferous, Triassic, and Jurassic (?), Wyoming: Condit, 202.
- Chugwater formation, Triassic, Wyoming: Bowen, 88.
- Cimarron group, Permian, Kansas: Moore and Haynes, 697.
- Cimarron series, Permian, Kansas: Perrine, 751.
- Cisco division, Carboniferous, Texas: Drake, 266.
- Cisco formation, Pennsylvanian, Texas: Kempfer, 504.
- Claggett formation, Cretaceous, Montana: Bowen, 92; Hancock, 395.
- Claggett shale, Cretaceous, Montana: Collier, 200.
- Claiborne formation, Eocene, Florida: Sellards and Gunter, 842.
- Claiborne group, Eocene, Georgia: Cooke and Shearer, 206.
- Claremont shale, Miocene, California: Clark, 172.
- Clarion sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Clarksburg fire clay shale, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Clarksburg limestone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Clarksburg red shale, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Clayton limestone, Tertiary, Alabama: Hager, 387.
- Clear Creek bed, Carboniferous, Texas: Drake, 266.
- Clear Creek formation, Devonian, Missouri: Branson, 102.
- Clear Creek sandstone, Pennsylvanian, Missouri: Greene, 363.
- Clem Creek sandstone, Carboniferous, Oklahoma: Emery, 287.
- Cliff Lake granite porphyry, pre-Cambrian, Manitoba: Bruce, 113.
- Clinch sandstone, Silurian, Virginia: Hinds, 439.
- Clinton formation, Silurian, Maryland: Clark *et al.*, 179.
- Clinton formation, Silurian, Pennsylvania: Butts, 142.
- "Clinton group," Silurian, New York: Chadwick, 158.

- Clore formation, Mississippian, Kentucky and Illinois: Butts, 140; Ulrich, 962.
- Cloverly formation, Cretaceous, Montana: Hancock, 395.
- Cloverly formation, Cretaceous, Wyoming: Bowen, 88; Moody and Talliaferro, 688; Wegemann, 1010.
- Cobalt series, pre-Cambrian, Ontario: Burrows, 132.
- Cobalt series, pre-Cambrian, Quebec: Wilson, 1058.
- Cochahee sandstone, Pennsylvanian, Oklahoma: Winchester, *et al.*, 1067.
- Cockeysville marble, Cambro-Ordovician, Maryland: Clark *et al.*, 179.
- Cockfield formation, Tertiary, Gulf coast: Matteson, 634.
- Coconino sandstone, Carboniferous, Arizona: Schuchert 828.
- Cody shale, Cretaceous, Wyoming: Moody and Talliaferro, 688.
- Coffeyville limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Coleman bed, Carboniferous, Texas: Drake, 266.
- Coleman Junction bed, Carboniferous, Texas: Drake, 266.
- Collingsworth gypsum member, Permian, Oklahoma: Aurin, 27.
- Colorado formation, Cretaceous, Montana: Pardee, 738.
- Colorado shale, Cretaceous, Montana: Bowen, 92; Hancock, 395; Stebinger, 915.
- Columbia group, Quaternary, Maryland: Clark *et al.*, 179; Little, 577.
- Columbia lava, Tertiary, Oregon: Smith, 884.
- Comanche series, Cretaceous, Texas and Oklahoma: Stephenson, 909.
- Comanche system: Moore and Haynes, 697.
- Comanche Creek bed, Carboniferous, Texas: Drake, 266.
- Comanche Peak limestone, Cretaceous, Texas: Drake, 266.
- Conasauga formation, Cambrian, Georgia: Shearer, 858.
- Concord formation, Oligocene, California: Clark, 172.
- Conemaugh formation, Pennsylvanian, Maryland: Clark *et al.*, 179.
- Conemaugh series, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Connellsville sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Connellsville (Lower) sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Cook Mountain formation, Tertiary, Texas: Matteson, 634.
- Coon Mountain bed, Carboniferous, Texas: Drake, 266.
- Cooper limestone, Devonian, Missouri: Branson, 102.
- Corral Hollow shales, Mesozoic, California: Davis, 230.
- Cotton limestone, Carboniferous, Oklahoma: Bowen, 91; Cullen, 213.
- Cottonwood limestone member, Permian, Kansas: Moore and Haynes, 697.
- Cottonwood Creek bed, Carboniferous, Texas: Drake, 266.
- Council Grove formation, Permian, Kansas: Moore and Haynes, 697.
- Covada group, Carboniferous (?), Washington: Pardee, 741.
- Craghead Creek shale, Devonian, Missouri: Branson, 102.
- Crouse limestone, Carboniferous, Oklahoma: Bowen, 91; Cullen, 213.
- Cypress sandstone, Mississippian, Illinois and Kentucky: Ulrich, 962.
- Cypress sandstone, Mississippian, Missouri: Branson, 102.
- Cypress ("Big Clifty") sandstone, Mississippian, Kentucky and Illinois: Butts, 140.
- Cypress Hills beds, Oligocene, Saskatchewan: Davis, 233.
- Cyrene limestone, Silurian, Missouri: Branson, 102.
- Dakota formation, Cretaceous, Utah: Drake, 219.
- Dakota sandstone, Cretaceous, Colorado, New Mexico: Lee, 554.
- Dakota sandstone, Cretaceous, Colorado: Ziegler, 1091.
- Dakota sandstone, Cretaceous, Kansas: Moore and Haynes, 697; Perrine, 751.
- Dakota sandstone, Cretaceous, South Dakota: Darton, 228.
- Dakota sandstone, Cretaceous, Utah: Emery, 258.
- Darby formation, Devonian, Wyoming: Blackwelder, 76.
- Davis member, Cambrian, Missouri: Branson, 102; Tarr, 932.
- Day Creek dolomite member, Permian, Kansas: Moore and Haynes, 697.
- Deadwood formation, Cambrian, South Dakota: Darton, 228.
- Decaturville chert, Devonian, Tennessee: Dunbar, 273.
- Decew member of Lockport, Silurian, New York: Chadwick, 158.
- Decota sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.

- Deerwood iron-bearing member, pre-Cambrian, Minnesota: Harder and Johnston, 408.
- Denison formation, Cretaceous, Texas: Stephenson, 909.
- Denton clay member, Cretaceous, Texas: Stephenson, 909.
- Del Rio clay, Cretaceous, Texas: Roberts, 794.
- De Queen limestone member, Cretaceous, Arkansas: Miser and Purdue, 679, 680.
- Derby formation, Cambrian, Missouri: Tarr, 932.
- Derby member, Cambrian, Missouri: Branson, 102.
- Des Moines group, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Des Moines group, Pennsylvanian, Missouri: Branson, 102.
- Devils Den limestone, Carboniferous, Texas: Böse, 85.
- Devils Island sandstone, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Devil's River limestone, Cretaceous, Texas: Roberts, 794.
- Dewey limestone, Carboniferous, Oklahoma: Cullen, 218; Lloyd and Mather, 579.
- Dewey limestone, Pennsylvanian, Oklahoma: Greene, 363.
- Dewitt formation, Tertiary, Texas: Mattheson, 634.
- Diamond Peak quartzite, Pennsylvanian: Kirk, 519.
- Dierks limestone lentil, Cretaceous, Arkansas: Miser and Purdue, 679, 680.
- Dimple formation, Pennsylvanian, Texas: Baker and Bowman, 32.
- Dinwoody formation, Permian or lower Triassic, Wyoming: Blackwelder, 76.
- Dinwoody formation, Triassic, Wyoming: Condit, 202.
- Doerun member, Cambrian, Missouri: Branson, 102.
- Dog Creek dolomite member, Permian, Oklahoma: Aurin, 27.
- Dog Creek shale member, Permian, Kansas: Moore and Haynes, 697.
- Dog Creek shale member, Permian, Oklahoma: Aurin, 27.
- Dolores formation, Triassic, Utah: Dake, 219.
- Donnelly iron ore, Silurian, New York: Chadwick, 158.
- Dorwin sandstone member, Carboniferous, Wyoming: Blackwelder, 76.
- Dotham series, Jurassic, Oregon: Davis, 230.
- Double Mountain stage, Permian, Texas: Beede and Waite, 59.
- Douglas formation, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Douglas formation, Pennsylvanian, Missouri: Branson, 102.
- Doyle shale member, Permian, Kansas: Moore and Haynes, 697.
- Drum limestone, Pennsylvanian, Missouri: McCourt, 608; Wilson, 1057.
- Drum limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Duck Creek formation, Cretaceous, Texas: Stephenson, 909.
- Duluth gabbro, pre-Cambrian, Minnesota: Harder and Johnston, 406.
- Duncan series, pre-Carboniferous, British Columbia: Bancroft, 38.
- Dunkard formation, Permian, Maryland: Clark *et al.*, 179.
- Dunvegan formation, Cretaceous, Alberta: McLearn, 610.
- Eagle limestone and shale, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Eagle sandstone, Cretaceous, Montana: Bowen, 92; Hancock, 395.
- Eagle (?) sandstone, Cretaceous, Montana: Collier, 200.
- Eagle Creek formation, Eocene, Washington and Oregon: Chaney, 166.
- Eagle Ford clay, Cretaceous, Texas and Oklahoma: Stephenson, 909.
- Eagle Ford formation, Cretaceous, Texas: Roberts, 794.
- East Lynn sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Ector tongue, Cretaceous, Texas: Stephenson, 909.
- Edgewood formation, Silurian, Missouri: Branson, 102.
- Edmonton formation, Cretaceous, Alberta: Allan, 12.
- Eileen sandstone, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Elbrook limestone, Cambrian, Maryland: Clark *et al.*, 179.
- Elgin sandstone, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Elgin sandstone, Pennsylvanian, Oklahoma: Greene, 363.
- Elk conglomerates, Cretaceous, British Columbia: Rose, 806.
- Elk Lick limestone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Ellenburger formation, pre-Carboniferous, Texas: Kempfer, 504.
- Elliott Creek bed, Carboniferous, Texas: Drake, 266.
- Ellis formation, Jurassic, Montana: Collier, 200; Condit, 202; Pardee, 738; Stebinger, 915.
- Elm Creek bed, Carboniferous, Texas: Drake, 266.
- Elm Creek limestone, Carboniferous, Texas: Böse, 85.
- Elmdale shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Elvins formation, Cambrian, Missouri: Branson, 102; Tarr, 932.
- Eminence chert, Cambrian, Missouri: Tarr, 932.
- Eminence formation, Ozarkian, Missouri: Branson, 102.
- Emporia limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Englewood limestone, Carboniferous, South Dakota: Darton, 228.

- Enid formation, Permian, Kansas: Moore and Haynes, 697.
- Enid formation, Permian, Oklahoma: Aurin, 27.
- Enterprise shale member, Permian, Kansas: Moore and Haynes, 697.
- Erwin quartzite, Cambrian, Virginia: Hewett *et al.*, 433.
- Escamela limestones, Cretaceous, Mexico: Dumble, 271.
- Eskridge shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Estevan beds, Eocene, Saskatchewan: Davis, 233.
- Etchegoin formation, Miocene, California: English, 294.
- Eutaw sand, Cretaceous, Alabama: Hager, 387.
- Evanston formation (?), Cretaceous, Wyoming: Schultz, 833.
- Fabre series, pre-Cambrian, Quebec: Wilson, 1058.
- Ferguson gypsum member, Permian, Oklahoma: Aurin, 27.
- Fern Glen formation, Mississippian, Missouri: Branson, 102.
- Ferne formation, Jurassic, British Columbia: Rose, 806.
- Fernvale formation, Ordovician, Missouri: Branson, 102.
- Ferris formation, Tertiary (?) Wyoming: Bowen, 88.
- Fiborn limestone, Silurian, Michigan: Savage and Crooks, 818.
- Fitzgerald limestones, Silurian, Northwest Territory: Cameron, 146.
- Flat Gap member, Devonian, Tennessee: Dunbar, 273.
- Flathead beds, Cretaceous, British Columbia: Rose, 806.
- Flathead quartzite, Cambrian, Montana: Blackwelder, 76; Pardee, 738.
- Flathead quartzite, Cambrian, Wyoming: Schultz, 833.
- Flaxville gravel, Miocene or Pliocene, Montana: Collier and Thom, 201.
- Flaxville gravel, Tertiary, Montana: Collier, 200.
- Fleming clay, Tertiary, Gulf coast: Matteson, 634.
- Florence flint member, Permian, Kansas: Moore and Haynes, 697.
- Flowerpot shale member, Permian, Kansas: Moore and Haynes, 697.
- Foraker limestone, Carboniferous, Oklahoma: Bowen, 91; Cullen, 213; Heald, 423.
- Forest Hill sand, Tertiary, Mississippi: Cullen, 213.
- Fort Riley limestone member, Permian, Kansas: Moore and Haynes, 697.
- Fort Scott formation, Pennsylvanian, Kansas and Oklahoma: Berger, 64.
- Fort Scott limestone, Pennsylvanian, Missouri: McCourt, 606.
- Fort Scott limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Fort Union formation, Eocene, North Dakota: Quirk, 772.
- Fort Union formation, Eocene (?) North Dakota: Collier, 199.
- Fort Union formation, Eocene, Saskatchewan: Davis, 233.
- Fort Union formation, Eocene, Wyoming: Wegemann, 1010.
- Fort Union formation, Tertiary, Montana: Collier, 200.
- Fort Worth limestone, Cretaceous, Texas: Shuler, 864; Stephenson, 909.
- Fourmile sandstone, Pennsylvanian, Oklahoma: Bowen, 89.
- Fox Ford bed, Carboniferous, Texas: Drake, 266.
- Fox Hills formation, Cretaceous, Saskatchewan: Davis, 233.
- Franciscan formation, Jurassic (?), California: English, 294.
- Franciscan group, Mesozoic, California: Davis, 230, 232.
- Franklin limestone, pre-Cambrian, Pennsylvania: Jonas, 485.
- Franks conglomerate, Oklahoma: Cullen, 213.
- Freda sandstone, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Fredericksburg group, Cretaceous, Texas and Oklahoma: Stephenson, 909.
- Fredericksburg limestone, Cretaceous, Texas: Drake, 266.
- Fredonia oolite member, Mississippian, Kentucky and Illinois: Butts, 140; Ulrich, 962.
- Freeport (Lower) limestone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Freeport (Lower) sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Freeport (Upper) limestone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Freeport (Upper) sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Frontier formation, Cretaceous, Wyoming: Bowen, 88; Moody and Tallaferrro, 688.
- Frontier formation, Cretaceous, Wyoming and Idaho: Schultz, 833.

136 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1918.

- Galesburg shale, Pennsylvanian, Missouri: McCourt, 606; Wilson, 1057.
- Galesburg shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Galice series, Jurassic, Oregon: Davis, 230.
- Gallatin limestone, Cambrian, Wyoming and Idaho: Schultz, 833.
- Gallatin limestone, Cambrian, Wyoming and Montana: Blackwelder, 76.
- Gaptank formation, Pennsylvanian, Texas: Udden, 959.
- Garibaldi volcanic formation, Pleistocene, British Columbia: Burwash, 135.
- Garrison limestone and shale member, Permian, Kansas: Moore and Haynes, 697.
- Gasconade formation, Ordovician, Missouri: Tarr, 932.
- Gasconade formation, Ozarkian, Missouri: Branson, 102.
- Gasper oolite, Mississippian, Kentucky: Butts, 140; Ulrich, 962.
- Gates limestone, Silurian, New York: Chadwick, 158.
- Gatesburg formation, Ozarkian, Pennsylvania: Butts, 142.
- Genesee member, Devonian, Maryland: Clark *et al.*, 179.
- Genesee shale, Devonian, New York: Grabau, 355.
- Glants Range granite, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Gilbert (Upper) sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Gilboy sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Gilliam formation, Permian, Texas: Udden, 959.
- Girardeau limestone, Silurian, Missouri: Branson, 102.
- Gladeville sandstone, Pennsylvanian, Virginia: Hinds, 439.
- Glen Dean limestone, Mississippian, Kentucky and Illinois: Butts, 140; Ulrich, 952.
- Glendon limestone member, Tertiary, Alabama and Mississippi: Cooke, 205.
- Glen Park limestone, Mississippian, Missouri: Branson, 102.
- Glenrose beds, Cretaceous, Texas: Böse, 85.
- Golconda formation, Mississippian, Kentucky and Illinois: Butts, 140; Ulrich, 962.
- Golconda shale, Mississippian, Illinois and Kentucky: Ulrich, 962.
- Grand Tower limestone, Devonian, Missouri: Branson, 102.
- Graneros shale, Cretaceous, Colorado: Ziegler, 1091.
- Graneros shale, Cretaceous, South Dakota: Darton, 228.
- Graneros shale member, Cretaceous, Kansas: Moore and Haynes, 697.
- Grape Creek bed, Carboniferous, Texas: Drake, 266.
- Grape Creek formation, Permian, Texas: Beede and Waite, 59.
- Grassy Creek shale, Mississippian, Missouri: Branson, 102.
- Gravina series, Triassic, Alaska: Chapin, 167.
- Grayhorse limestone, Carboniferous, Oklahoma: Bowen, 91.
- Grayson marl member, Cretaceous, Texas: Stephenson, 909.
- Great Smoky formation, Georgia: Shearer and Hull, 859.
- Greenbrier formation, Mississippian, Maryland: Clark *et al.*, 179.
- Greenbrier limestone, Mississippian, West Virginia: Reger and Teets, 778.
- Greenhorn limestone, Cretaceous, Colorado: Ziegler, 1091.
- Greenhorn limestone, Cretaceous, South Dakota: Darton, 228.
- Greenhorn limestone member, Cretaceous, Kansas: Moore and Haynes, 697.
- Green River formation, Tertiary, Colorado: Ziegler, 1091.
- Green River formation, Tertiary, Utah: Winchester, 1066.
- Greer formation, Permian, Kansas: Moore and Haynes, 697.
- Greer formation, Permian, Oklahoma: Aurlin, 27.
- Grimsby (Medina) sandstone, Silurian, New York: Chadwick, 158.
- Grizzly Bear formation, Cretaceous, Alberta: Allan, 12; Slipper, 871.
- Gros Ventre formation, Cambrian, Wyoming: Blackwelder, 76; Schultz, 833.
- Gulf series, Cretaceous, Texas and Oklahoma: Stephenson, 909.
- Guyandot sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Hackberry shale member, Permian, Kansas: Moore and Haynes, 697.
- Hamilton formation, Devonian, Pennsylvania: Butts, 142.

- Hardin sandstone member, Devonian, Tennessee: Dunbar, 273.
- Hardinsburg sandstone, Mississippian, Illinois and Kentucky: Butts, 140; Ulrich, 962.
- Harper sandstone member, Permian, Kansas: Moore and Haynes, 697.
- Harpers formation, Cambrian, Maryland: Clark *et al.*, 179.
- Harrell shale, Devonian, Pennsylvania: Butts, 142.
- Harriman novaculite, Devonian, Tennessee: Dunbar, 273.
- Hartridge black shale, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Harvey conglomerate, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Hasmark formation, Cambrian, Montana: Pardee, 738.
- Hatchitigbee formation, Tertiary, Alabama: Hager, 387.
- Haymond formation, Pennsylvanian, Texas: Baker and Bowman, 32.
- Hay River limestones, Devonian, Northwest Territory: Cameron, 146.
- Hay River shales, Devonian, Northwest Territory: Cameron, 146.
- Haystack gypsum member, Permian, Oklahoma: Aurlin, 27.
- Helderberg formation, Devonian, Maryland: Clark *et al.*, 179.
- Helderberg limestone, Devonian, Pennsylvania: Butts, 142.
- Hendricks dolomite, Silurian, Michigan: Savage and Crooks, 818.
- Henrietta formation, Pennsylvanian, Missouri: Branson, 102; McCourt, 606; Wilson, 1057.
- Henshaw formation, Pennsylvanian, Kentucky: Lee, 552.
- Herkimer sandstone, Silurian, New York: Chadwick, 158.
- Herrington, limestone, Oklahoma: Cullen, 213.
- Herrington limestone member, Permian, Kansas: Moore and Haynes, 697.
- Hertha limestone, Pennsylvanian, Missouri: McCourt, 606; Wilson, 1057.
- Hertha limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Hess formation, Permian, Texas: Udden, 959.
- Hilliard formation (?), Cretaceous, Wyoming: Schultz, 833.
- Hog Creek bed, Carboniferous, Texas: Drake, 266.
- Hogshooter limestone, Carboniferous, Oklahoma: Cullen, 213; Lloyd and Mather, 579; Ross, 91.
- Holston marble, Ordovician, Tennessee: Stose and Schrader, 923.
- Holtscaw sandstone, Mississippian, Kentucky and Indiana: Butts, 140.
- Horne Creek bed, Carboniferous, Texas: Drake, 266.
- Homewood sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Hordes Creek bed, Carboniferous, Texas: Drake, 266.
- Horse Creek bed, Carboniferous, Texas: Drake, 266.
- Horse Creek clays and shales, Carboniferous, Texas: Drake, 266.
- Horstethief sandstone, Cretaceous, Montana: Stebinger, 915.
- Howard limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Iatan limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Illinoian drift, Pleistocene, Wisconsin: Alden, 8.
- Indian Creek bed, Carboniferous, Texas: Drake, 266.
- Ingleide chert, Mesozoic, California: Davis, 230.
- Iola limestone, Pennsylvanian, Missouri: McCourt, 606; Wilson, 1057.
- Iola limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Iowan drift, Pleistocene, Wisconsin: Alden, 8.
- Irondequoit limestone, Silurian, New York: Chadwick, 158.
- Jacalitos formation, Miocene, California: English, 294.
- Jackson formation, Tertiary, Alabama and Mississippi: Cooke, 205.
- Jackson formation, Tertiary, Gulf coast: Matteson, 634.
- Jagger Bend bed, Carboniferous, Texas: Drake, 266.
- Jane Lew sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Jefferson limestone, Devonian, Montana: Pardee, 738.
- Jefferson limestone, Devonian, Wyoming: Schultz, 833.
- Jefferson City formation, Ordovician, Missouri: Branson, 102; Tarr, 932.
- Jenkins shale member, Permian, Kansas: Moore and Haynes, 697.
- Jennings formation, Devonian, Maryland: Clark *et al.*, 179.
- Joachim formation, Ordovician, Missouri: Branson, 102.
- Johnstown cement limestone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Judith River formation, Cretaceous, Montana: Bowen, 92; Collier, 200; Hancock, 395.
- Juniata formation, Ordovician, Maryland: Clark *et al.*, 179.
- Juniata formation, Silurian, Pennsylvania: Butts, 142.
- Kalbab limestone, Carboniferous, Arizona: Schuchert, 828.
- Kaminis granite, pre-Cambrian, Manitoba: Bruce, 113.
- Kaminis granite, pre-Cambrian, Saskatchewan: Bruce, 111.
- Kanawha black flint, Pennsylvanian, West Virginia: Reger and Teets, 778.

- Kanawha group, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Kansas City formation, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Kansas City formation, Pennsylvanian, Missouri: Branson, 102; McCourt, 606; Wilson, 1057.
- Kanwaka shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Kaslo volcanics, Carboniferous, British Columbia: Bancroft, 38.
- Keepaloo iron formation, pre-Cambrian, Belcher Islands, Canada: Moore, 603.
- Kenwood sandstone, Mississippian, Kentucky and Indiana: Butts, 140.
- Keokuk limestone, Mississippian, Missouri: Branson, 102.
- Keokuk limestone, Mississippian, Missouri and Iowa: Van Tuyl, 972.
- Ketchikan series, Carboniferous and Triassic, Alaska: Chapin, 167.
- Kiamichi clay, Cretaceous, Texas: Stephenson, 909.
- Kiamichi formation, Oklahoma: Cullen, 213.
- Kimmawick limestone, Ordovician, Missouri: Branson, 102.
- Kintla formation, pre-Cambrian, British Columbia: Rose, 806.
- Kiowa shale, Comanchean, Kansas: Moore and Haynes, 697; Perrine, 751.
- Kiowa shales, Cretaceous, Kansas: Twenhofel, 956.
- Kirk tuffs, Oligocene, California: Clark, 172.
- Kirkland formation, Silurian, Pennsylvania and Maryland: Ulrich, 903.
- Kirkland iron ore, Silurian, New York: Chadwick, 158.
- Kirkland Lake series, pre-Cambrian, Quebec: Wilson, 1058.
- Kiser gypsum member, Permian, Oklahoma: Aurlin, 27.
- Kisheneau formation, Tertiary, British Columbia: Rose, 806.
- Kisseynew gneiss, pre-Cambrian, Saskatchewan: Bruce, 111.
- Kisseynew group, pre-Cambrian, Manitoba: Bruce, 113.
- Kittanning (Lower) fire clay, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Kittanning (Upper) fire clay, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Klutina group, Carboniferous or pre-Carboniferous, Alaska: Chapin, 168.
- Knife Lake slate, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Knight formation, Tertiary, Wyoming and Idaho: Schultz, 833.
- Knox dolomite, Cambro-Ordovician, Georgia: Shearer, 858.
- Knox dolomite, Ordovician, Tennessee: Stose and Schrader, 923.
- Kootenai formation, Cretaceous, Montana: Bowen, 92; Condit, 202; Hancock, 395; Pardee, 738; Stebinger, 915.
- Kootenai (?) formation, Cretaceous, Montana: Collier, 200.
- Kootenay formation, Cretaceous, British Columbia: Rose, 806.
- Kreyenhagen shale, Oligocene, California: Clark, 172.
- Labadie limestone, Carboniferous, Oklahoma: Bowen, 90; Clark, 174.
- Labadie limestone, Pennsylvanian, Oklahoma: Winchester *et al.*, 1067.
- Labette shale, Pennsylvanian, Missouri: McCourt, 606.
- Labette shale, Pennsylvanian, Oklahoma: Greene, 363.
- Labette shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- La Cruz marl, Tertiary, West Indies: Vaughan, 979.
- Ladore shale, Pennsylvanian, Missouri: McCourt, 606; Wilson, 1057.
- Ladore shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- "Lafayette" formation, Mississippi Valley: Shaw, 850.
- Lafayette formation, Tertiary, Alabama: Hager, 387.
- Lafayette gravel, Tertiary, Alabama: Shaw, 855.
- Lakeport limestones, Silurian, New York: Chadwick, 158.
- Lake Superior sandstone, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Lakota sandstone, Cretaceous, South Dakota: Darton, 228.
- Lamotte sandstone, Cambrian, Missouri: Branson, 102.
- Lance formation, Eocene, North Dakota: Collier, 199.
- Lance formation, Tertiary (?) , Montana: Bowen, 92; Collier, 200; Hancock, 395.
- Lance formation, Tertiary (?), Wyoming: Wegemann, 1010.
- Lane shale, Pennsylvanian, Missouri: McCourt, 606.
- Lane shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Lansing formation, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Lansing formation, Pennsylvanian, Missouri: Branson, 102; McCourt, 606.
- La Plata group, Jurassic, Utah: Emery, 288.
- La Plata sandstone, Jurassic, Utah: Dake, 219.
- "Laramie" formation, Cretaceous, Colorado, New Mexico: Lee, 554.
- Lardeau diabase schists, post-Carboniferous (?), British Columbia: Bancroft, 38.
- Larder Lake series, pre-Cambrian, Quebec: Wilson, 1058.
- Larke dolomite, Ozarkian, Pennsylvania: Butts, 142.

- Las Cahobes beds, Tertiary, Haiti: Jones, 490.
- Lawrence shale member, Pennsylvanian, Kansas: Moore and Haynes, 687.
- Lea Park formation, Cretaceous, Alberta: Allan, 12; Shipper, 871.
- Lecompton limestone, Carboniferous, Oklahoma: Bowen, 90; Clark, 174; Heald and Mather, 425.
- Lecompton limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Lee formation, Pennsylvanian, Virginia: Hinds, 439.
- Leigh dolomite member, Ordovician, Wyoming: Blackwelder, 76.
- Lemont limestone member, Ordovician, Pennsylvania: Butts, 142.
- Lenapah limestone, Oklahoma: Cullen, 213.
- Lennep sandstone, Cretaceous, Montana: Hancock, 395.
- Lenoir limestone, Ordovician, Tennessee: Stose and Schrader, 923.
- Leonard formation, Permian, Texas: Udden, 959.
- Lewis shale, Cretaceous, Colorado, New Mexico: Lee, 554.
- Lewis shale, Cretaceous, Wyoming: Bowen, 88; Wegemann, 1010.
- Lincolnton chert, Mississippian, Oklahoma: Perry, 752.
- Linden or Helderbergian group, Devonian, Tennessee: Dunbar, 273.
- Lisbon formation, Tertiary, Alabama: Hager, 387.
- Lissie gravel, Tertiary, Alabama: Shaw, 855.
- Lissie gravel or Lafayette, Tertiary, Gulf coast: Matteson, 634.
- Little Homin limestone, Carboniferous, Oklahoma: Heald and Mather, 425.
- Lohn bed, Carboniferous, Texas: Drake, 266.
- Loon River formation, Cretaceous, Alberta: McLearn, 610.
- Loon River shales, Cretaceous, Northwest Territory: Cameron, 136.
- Lost City limestone, Pennsylvanian, Oklahoma: Greene, 363.
- Lost Creek bed, Carboniferous, Texas: Drake, 266.
- Loudon formation, Cambrian, Maryland: Clark *et al.*, 179.
- Louisiana limestone, Mississippian, Mississippi: Jones, 490.
- Lynch Creek bed, Carboniferous, Texas: Drake, 266.
- McAdam formation, Silurian, Nova Scotia: McLearn, 611.
- McBean formation, Eocene, Georgia: Cooke and Shearer, 206.
- McCarthy shale, Triassic, Alaska: Moffit, 683.
- McElmo formation, Cretaceous (?), Utah: Emery, 288.
- McElmo formation, Jurassic, Utah: Dake, 219.
- McKenzie formation, Silurian, Maryland: Clark *et al.*, 179.
- McKenzie limestone, Silurian, Pennsylvania: Butts, 142.
- McLeansboro formation, Pennsylvanian, Kentucky: Lee, 552.
- Madison limestone, Carboniferous, Montana: Collier, 200; Pardee, 738.
- Madison limestone, Carboniferous, Wyoming: Blackwelder, 76.
- Madison limestone, Carboniferous, Wyoming and Idaho: Schultz, 833.
- Madison limestone, Mississippian, Montana: Stebinger, 915.
- Madison sandstone, Cambrian, Wisconsin: Alden, 8.
- Magnesian (Lower), limestone, Ordovician, Wisconsin: Alden, 8.
- Magothy formation, Cretaceous, Maryland: Clark *et al.*, 179; Little, 577.
- Mahoning sandstone stage, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Main Street limestone member, Cretaceous, Texas: Stephenson, 909.
- Maissade beds, Tertiary, Haiti: Jones, 490.
- Mancos shale, Cretaceous, Colorado, New Mexico: Lee, 554.
- Mancos shale, Cretaceous, Utah: Emery, 288.
- Mangum dolomite member, Permian, Oklahoma: Aurin, 27.
- Manitoulin shale, Silurian, New York: Chadwick, 158.
- Maltrata limestone, Cretaceous, Mexico: Dumble, 271.
- Maplewood shale, Silurian, New York: Chadwick, 158.
- Maquoketa shale, Ordovician, Missouri: Bronson, 102.
- Maquoketa shale, Ordovician, Wisconsin: Alden, 8.
- Marathon series, Ordovician, Texas: Baker

- Marianna limestone, Tertiary, Alabama and Mississippi: Cooke, 205.
- Marin sandstone, Mesozoic, California: Davis, 230.
- Marion formation, Permian, Kansas: Moore and Haynes, 697; Perrine, 751.
- Markley formation, Oligocene, California: Clark, 172.
- Marmaton formation, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Marselles drift, Quaternary, Illinois: Cady, 143.
- Marshall Lake series, pre-Cambrian, Ontario: Hopkins, 455.
- Martinsburg formation, Ordovician, Maryland: Clark *et al.*, 179.
- Martville sandstone, Silurian, New York: Chadwick, 158.
- Matawan formation, Cretaceous, Maryland: Clark *et al.*, 179; Little, 577.
- Matfield shale member, Permian, Kansas: Moore and Haynes, 697.
- Mauch Chunk formation, Mississippian, Maryland: Clark *et al.*, 179.
- Mauch Chunk series, Mississippian, West Virginia: Reger and Teets, 778.
- Mauch Chunk shale, Mississippian, Pennsylvania: Butts, 142.
- Mayville beds, Silurian, Wisconsin: Alden, 8.
- Maywood formation, Silurian (?), Montana: Pardee, 738.
- Medicine Bow formation, Cretaceous, Wyoming: Bowen, 88.
- Medicine Lodge gypsum member, Permian, Kansas: Moore and Haynes, 697.
- Medicine Lodge gypsum member, Permian, Oklahoma: Aurin, 27.
- Meganos group, Eocene, California: Clark, 171.
- Menard limestone, Mississippian, Kentucky and Illinois: Butts, 140; Ulrich, 962.
- Mendez formation, Cretaceous and Tertiary, Mexico: Dumble, 271.
- Mendota limestone, Cambrian, Wisconsin: Alden, 8.
- Menteth limestone, Devonian, New York: Grabau, 355.
- Mentor beds, Comanchean, Kansas: Perrine, 751.
- Mentor beds, Cretaceous, Kansas: Twenhofel, 956.
- Meramec group, Mississippian, Kentucky and Illinois: Butts, 140.
- Mesaverde formation, Cretaceous, Colorado, New Mexico: Lee, 554.
- Mesaverde formation, Cretaceous, Wyoming, Bowen, 88; Moody and Talliaferro, 688; Wegemann, 1010.
- Meson beds, Tertiary, Mexico: Dumble, 271.
- Midway formation, Tertiary, Gulf coast: Matteson, 634.
- Midway group, Tertiary, Alabama: Hager, 387.
- Milford granite gneiss, pre-Carboniferous, Rhode Island: Hawkins, 412.
- Milwaukee formation, Devonian, Wisconsin: Alden, 8.
- Mines dolomite, Ozarkian, Pennsylvania: Butts, 142.
- Minnekahta limestone, Carboniferous, South Dakota: Darton, 228.
- Minnelusa sandstone, Carboniferous, South Dakota: Darton, 228.
- Minnewaste limestone, Cretaceous, South Dakota: Darton, 228.
- Mint Spring calcareous marl member, Alabama and Mississippi: Cooke, 205.
- Missi (Lower) formation, pre-Cambrian, Manitoba: Bruce, 113.
- Missi (Lower) series, pre-Cambrian, Saskatchewan: Bruce, 111.
- Missi (Upper) formation, pre-Cambrian, Manitoba: Bruce, 113.
- Missi (Upper) series, pre-Cambrian, Saskatchewan: Bruce, 111.
- Missouri group, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Missouri group, Pennsylvanian, Missouri: Branson, 102.
- Moenkopi formation, Triassic, Utah: Emery, 288.
- Monitor sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Monmouth formation, Cretaceous, Maryland: Clark *et al.*, 179; Little, 577.
- Monongahela formation (Elkgarden), Pennsylvanian, Maryland: Clark *et al.*, 179.
- Monongahela series, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Monte Sana group, Mississippian, Illinois and Kentucky: Ulrich, 962.
- Monterey group, California: Davis, 232.
- Moodys calcareous marl member, Alabama and Mississippi: Cooke, 205.
- Morgantown sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Morrison formation, Cretaceous (?), Colorado, New Mexico: Lee, 554.
- Morrison formation, Cretaceous, Wyoming: Bowen, 88.
- Morrison formation, Cretaceous (?), Wyoming: Wegemann, 1010.
- Morrison formation, Jurassic (?), Great Plains: Schuchert, 830.
- Morrison formation, Rocky Mountain region: Mook, 691.
- Morrison (?) formation, Cretaceous (?), Montana: Hancock, 395.
- Morrison shale, Cretaceous (?), South Dakota: Darton, 228.
- Morse Creek limestone, Devonian, New York: Grabau, 355.
- Moscow shale, Devonian, New York: Grabau, 355.
- Mt. Marion beds, Devonian, New York: Grabau, 355.
- Mt. Selman formation, Tertiary, Gulf coast: Matteson, 634.
- Mowry shale, Cretaceous, Montana: Collier, 200.
- Mowry shale, Cretaceous, Wyoming: Bowen, 88; Moody and Talliaferro, 688.

- Mowry shale member, Cretaceous, Wyoming: Wegemann, 1010.
- Moydart formation, Silurian, Nova Scotia: McLearn, 611.
- Muav limestone, Cambrian, Arizona: Schuchert, 829.
- Myrtle formation, Cretaceous, Oregon: Smith, 884.
- Myrtle Creek formation, Cretaceous, Alberta: Allan, 12.
- Naheola formation, Tertiary, Alabama: Hager, 387.
- Nanjemoy formation, Tertiary, Maryland: Clark *et al.*, 179; Little, 577.
- Naknek formation, Jurassic, Alaska: Chapin, 168.
- Nanafalia formation, Tertiary, Alabama: Hager, 387.
- Navajo sandstone, Jurassic, Utah: Emery, 288.
- Navarro formation, Cretaceous, Texas: Stephenson, 909.
- Nelson granite, Jurassic, British Columbia: Bancroft, 38.
- Neva limestone, Carboniferous, Oklahoma: Bowen, 91; Cullen, 213.
- Neva limestone, Permian, Kansas: Perrine, 751.
- Neva limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Newark formation, Triassic, Maryland: Clark *et al.*, 179.
- New Providence shale, Mississippian, Kentucky and Indiana: Butts, 140.
- New Richmond sandstone, Ordovician, Illinois: Cady, 143.
- New River group, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Newton limestone and shale, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Niagara dolomite, Silurian, Wisconsin: Alden, 8.
- Nikomelki sand and silt, Pleistocene, British Columbia: Burwash, 135.
- Niobrara formation, Cretaceous, Colorado: Ziegler, 1091.
- Niobrara formation, Cretaceous, Kansas: Moore and Haynes, 697.
- Niobrara formation, Cretaceous, Colorado, New Mexico: Lee, 554.
- Niobrara formation, Cretaceous, South Dakota: Darton, 228.
- Niobrara formation, Cretaceous, Wyoming: Bowen, 88; Wegemann, 1010.
- Nittany dolomite, Canadian, Pennsylvania: Butts, 142.
- Noix oolite, Silurian, Missouri: Branson, 102.
- Nonesuch shale, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- North Park formation, Tertiary, Wyoming: Bowen, 88.
- Northview formation, Mississippian, Missouri: Branson, 102.
- Norton formation, Pennsylvanian, Virginia: Hinds, 489.
- Nugget sandstone, Jurassic, Wyoming and Idaho: Schultz, 833.
- Nuttall sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Nuttall (Lower) sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Oakridge sandstone, Mesozoic, California: Davis, 230.
- Ocala formation, Eocene, Florida: Sellards and Gunter, 842.
- Ocala limestone, Eocene, Georgia: Cooke and Shearer, 206.
- Ocala limestone, Tertiary, Alabama and Mississippi: Cooke, 205.
- Ocoee group, Georgia: Shearer and Hull, 859.
- Ogalalla formation, Tertiary, Kansas: Moore and Haynes, 697.
- Ogishke conglomerate, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Ohara limestone member, Mississippian, Kentucky: Butts, 140; Ulrich, 962.
- Okaw formation, Mississippian, Missouri: Branson, 102.
- Okaw limestone, Mississippian, Illinois: Ulrich, 962.
- Okay limestone, Carboniferous, Oklahoma: Heald and Mather, 425.
- Okeas sandstone, Carboniferous, Oklahoma: Clark, 174; Hopkins, 454.
- Olive Hill formation, Devonian, Tennessee: Dunbar, 273.
- Oneota formation, Ordovician, Illinois: Cady, 143.
- Onondaga formation, Devonian, Pennsylvania: Butts, 142.
- Opeche formation, Carboniferous, South Dakota: Darton, 228.
- Oread limestone, Carboniferous, Oklahoma: Bowen, 90; Clark, 174; Cullen, 213.
- Oread limestone, Pennsylvanian, Oklahoma: Heald, 424.
- Oread limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Ore Hill limestone member, Ozarkian, Pennsylvania: Butts, 142.
- Oriental sandstone, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Oriskany formation, Devonian, Maryland: Clark *et al.*, 179.
- Oriskany group, Devonian, Tennessee: Dunbar, 273.
- Orisaba limestone, Cretaceous, Mexico: Dumble, 271.
- Orlando limestone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Oronto group, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Osage group, Mississippian, Kentucky, Indiana, and Illinois: Butts 140.
- Oswego sandstone, Silurian, Pennsylvania: Butts, 142.
- Ottosee shale, Ordovician, Tennessee: Stose and Schrader, 923.
- Otequago sandstone, Silurian, New York: Chadwick, 158.

- Outer conglomerate, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Owenyo limestone, Permian: Kirk, 519.
- Ozuluama series, Tertiary, Mexico: Dumble, 271.
- Pahasapa limestone, Carboniferous, South Dakota: Darton, 228.
- Paint Creek formation, Mississippian, Illinois: Ulrich, 962.
- Paint Rock bed, Carboniferous, Texas: Drake, 266.
- Paintrock formation, Permian, Texas: Beede and Waite, 59.
- Pakan formation, Cretaceous, Alberta: Allan, 12.
- Palestine sandstone, Mississippian, Kentucky and Illinois: Butts, 140; Ulrich, 962.
- Paluxy sands, Cretaceous, Texas: Drake, 266.
- Pamunkey group, Tertiary, Maryland: Clark *et al.*, 179.
- Papagallo shales, Cretaceous, Mexico: Dumble, 271.
- Park City formation, Carboniferous, Utah and Wyoming: Blackwelder, 76.
- Park City formation, Carboniferous, Wyoming: Condit, 202.
- Park City formation, Pennsylvanian and Permian, Utah: Schultz, 834.
- Parkman sandstone member, Cretaceous, Wyoming: Wegemann, 1010.
- Parks Mountain bed, Carboniferous, Texas: Drake, 266.
- Paso Robles formation, Pliocene, California: English, 294.
- Pasopansa member, Tertiary, Maryland: Little, 577.
- Patapsco formation, Cretaceous, Maryland: Clark *et al.*, 179; Little, 577.
- Patzent formation, Cretaceous, Maryland: Clarke *et al.*, 179; Little, 577.
- Pawhuska limestone, Pennsylvanian, Oklahoma: Heald, 424.
- Pawnee limestone, Oklahoma: Cullen, 213.
- Pawnee limestone, Pennsylvanian, Missouri: McCourt, 606.
- Pawnee limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Pawpaw sandy member, Cretaceous, Texas: Stephenson, 909.
- Peace River formation, Cretaceous, Alberta: McLearn, 610.
- Peachbottom slate, Ordovician (?), Maryland: Clark *et al.*, 179.
- Pearl shale member, Permian, Kansas: Moore and Haynes, 697.
- Pecan Gap chalk member, Cretaceous, Texas: Stephenson, 909.
- Pegram limestone, Devonian, Tennessee: Dunbar, 273.
- Pennington shale, Mississippian, Virginia: Hinds, 439.
- Phoenix or Schroeppel shale, Silurian, New York: Chadwick, 158.
- Phosphoria formation, Carboniferous, Wyoming and Idaho: Schultz, 833.
- Phosphoria formation, Carboniferous and Triassic (?), Montana: Condit, 202.
- Pierre formation, Cretaceous, Saskatchewan: Davis, 233.
- Pierre shale, Cretaceous, Alberta: Slipper, 871.
- Pierre shale, Cretaceous, Colorado: Ziegler, 1091.
- Pierre shale, Cretaceous, Kansas: Moore and Haynes, 697.
- Pierre shale, Cretaceous, Colorado, New Mexico: Lee, 554.
- Pierre shale, Cretaceous, North Dakota: Collier, 199.
- Pierre shale, Cretaceous, South Dakota: Darton, 228.
- Pierson limestone, Mississippian, Missouri: Branson, 102.
- Pike gravel member, Cretaceous, Arkansas: Miser and Purdue, 679, 680.
- Pine Creek limestone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Pine Point limestone, Devonian, Northwest Territory: Cameron, 146.
- Pine Ridge sandstone, Devonian, Pennsylvania: Butts, 142.
- Piscataway member, Tertiary, Maryland: Little, 577.
- Pitkin limestone, Oklahoma: Cullen, 213.
- Pittsburgh (Lower) sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Pittsburgh red shale, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Platteville-Galena dolomite, Ordovician, Illinois: Cady, 143.
- Plattin formation, Ordovician, Missouri: Branson, 102.
- Plattsburg limestone, Pennsylvanian, Missouri: McCourt, 606.
- Plattsburg limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Pleasant Hill limestone, Cambrian, Pennsylvania: Butts, 142.
- Pleasanton formation, Pennsylvanian, Missouri: Branson, 102; McCourt, 606.
- Pleasanton shale, Pennsylvanian, Missouri: Wilson, 1057.
- Pleasanton shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Plum Creek bed, Mississippian, Illinois and Kentucky: Ulrich, 962.
- Plummer limestone, Carboniferous, Oklahoma: Bowen, 90; Clark, 174.
- Pocono formation, Mississippian, Maryland: Clark *et al.*, 179.
- Pocono formation, Mississippian, Pennsylvania: Butts, 142.
- Pocono sandstone series, Mississippian, West Virginia: Reger and Teets, 778.
- Polson Canyon formation, Eocene, Colorado, New Mexico: Lee, 554.
- Pokegama quartzite, pre-Cambrian, Minnesota: Harder and Johnston, 403.
- Pontiac series, pre-Cambrian, Quebec: Wilson, 1058.
- Portage member, Devonian, Maryland: Clark *et al.*, 179.

- Potapaco member, Tertiary, Maryland : Little, 577.
- Potomac group, Cretaceous, Maryland : Clark *et al.*, 179 ; Little, 577.
- Potosi formation, Cambrian, Missouri : Tarr, 932.
- Potosi formation, Ozarkian, Missouri : Branson, 102.
- Pottsville formation, Carboniferous, Illinois : Cady, 143.
- Pottsville formation, Mississippian, Pennsylvania : Butts, 142.
- Pottsville formation, Pennsylvanian, Maryland : Clark *et al.*, 179.
- Pottsville group, Pennsylvanian, Kentucky : Butts, 140 ; Lee, 552.
- Pottsville series, Pennsylvanian, West Virginia : Reger and Teets, 778.
- Prairie du Chien group, Ordovician, Illinois : Cady, 143.
- Presque dolomites, Devonian, Northwest Territory : Cameron, 146.
- Proctor formation, Cambrian, Missouri : Tarr, 932.
- Proctor formation, Ozarkian, Missouri : Branson, 102.
- Puckwunge conglomerate, pre-Cambrian, Minnesota : Hader and Johnston, 403.
- Puget series, Eocene, British Columbia : Burwash, 135.
- Purgatoire formation, Cretaceous, Colorado, New Mexico : Lee, 554.
- Puyallup erosion-interval, Pleistocene, British Columbia : Burwash, 135.
- Pyburn limestone, Devonian, Tennessee : Dunbar, 273.
- Quadrant formation, Carboniferous, Montana : Pardee, 738.
- Quadrant quartzite, Carboniferous, Montana : Condit, 202.
- Quakertown black slate, Pennsylvanian, West Virginia : Reger and Teets, 778.
- Quall limestone, Devonian, Tennessee : Dunbar, 273.
- Quartermaster formation, Permian, Oklahoma : Aurin, 27.
- Racine beds, Silurian, Wisconsin : Alden, 8.
- Raleigh (Upper) sandstone, Pennsylvanian, West Virginia : Reger and Teets, 778.
- Rancocas formation, Cretaceous, Maryland : Clark *et al.*, 179.
- Raritan formation, Cretaceous, Maryland : Clark *et al.*, 179 ; Little, 577.
- Raton formation, Eocene, Colorado, New Mexico : Lee, 554.
- Ravenscrag beds, Eocene, Saskatchewan : Davis, 233.
- Redstone limestone, Pennsylvanian, West Virginia : Reger and Teets, 778.
- Redwall limestone, Carboniferous, Arizona : Schuchert, 828.
- Reed dolomite, pre-Cambrian, California : Kirk, 519.
- Reedsville shale, Ordovician, Pennsylvania : Butts, 142.
- Renault formation, Mississippian, Illinois : Ulrich, 962.
- Revard sandstone, Carboniferous, Oklahoma : Clark, 174.
- Revard sandstone, Pennsylvanian, Oklahoma : Winchester *et al.*, 1067.
- Reward conglomerate, Pennsylvanian : Kirk, 519.
- Reynales limestone, Silurian, New York : Chadwick, 158.
- Ribstone Creek formation, Cretaceous, Alberta : Slipper, 871.
- Ricker bed, Carboniferous, Texas : Drake, 266.
- Ridenhower shale, Mississippian, Kentucky and Illinois : Butts, 140 ; Ulrich, 962.
- Ridgely sandstone, Devonian, Pennsylvania : Butts, 142.
- Ripley formation, Cretaceous, Alabama : Hager, 387.
- Rochelle conglomerate, Carboniferous, Texas : Drake, 266.
- Rochester shale, Silurian, New York : Chadwick, 158.
- Rock Creek limestone, Pennsylvanian, Oklahoma : Greene, 363.
- Rockhill limestone, Carboniferous, Texas : B6se, 85.
- Rockhouse shale, Devonian, Tennessee : Dunbar, 273.
- Rockmart slate, Ordovician, Georgia : Shearer, 858.
- Rockvale sandstone member, Cretaceous, Colorado, New Mexico : Lee, 554.
- "Rockwood formation," Silurian, Virginia : Hinds, 439.
- Rodman limestone, Ordovician, Pennsylvania : Butts, 142.
- Rome formation, Cambrian, Georgia : Shearer, 858.
- Romney formation, Devonian, Maryland : Clark *et al.*, 179.
- Rosewood shale, Mississippian, Kentucky and Indiana : Butts, 140.
- Rosiclare sandstone member, Mississippian, Kentucky : Butts, 140 ; Ulrich, 962.
- Ross limestone member, Devonian, Tennessee : Dunbar, 273.
- Ross Brook formation, Silurian, Nova Scotia : McLearn, 611.
- Roxbury formation, Ordovician, Missouri :

- St. Bartholomew limestone, Tertiary, St. Bartholomew (West Indies): Vaughan, 379.
- St. Clair marble, Oklahoma: Cullen, 213.
- St. John formation, Cretaceous, Alberta: McLearn, 610.
- St. Lawrence (?) formation, Cambrian, Wisconsin: Alden, 8.
- St. Louis limestone, Mississippian, Kentucky and Indiana: Butts, 140.
- St. Louis limestone, Mississippian, Missouri: Branson, 102.
- St. Louis limestone, Mississippian, Missouri and Iowa: Van Tuyl, 972.
- St. Mary formation, Eocene (?), Montana: Stebinger, 915.
- St. Mary's formation, Tertiary, Maryland: Clark *et al.*, 179; Little, 577.
- St. Maurice formation, Tertiary, Louisiana: Matteson, 634.
- St. Peter sandstone, Ordovician, Illinois: Cady, 143.
- St. Peter sandstone, Ordovician, Missouri: Branson, 102.
- St. Peter sandstone, Ordovician, Wisconsin: Alden, 8.
- St. Stephens limestone, Tertiary, Alabama: Hager, 387.
- Ste. Genevieve limestone, Mississippian, Missouri: Branson, 102.
- Ste. Genevieve limestone, Mississippian, Kentucky and Indiana: Butts, 140.
- Ste. Genevieve limestone, Mississippian, Illinois and Kentucky, Ulrich, 962.
- Salem limestone, Mississippian, Missouri: Branson, 102.
- Salinas shale, Miocene, California: English, 294.
- Salt Plain shale member, Permian, Kansas: Moore and Haynes, 697.
- Saltsburg sandstone, Pennsylvanian, West Virginia, Reger and Teets, 778.
- Salt Wash sandstone member, Cretaceous, Utah: Emery, 288.
- Sample sandstone, Mississippian, Kentucky: Ulrich, 962.
- Sample sandstone member, Mississippian, Kentucky: Butts, 140.
- San Angelo formation, Permian, Texas: Beede and Waite, 59.
- San Felipe formation, Cretaceous, Mexico: Dumble, 271.
- San Juan limestones, Cretaceous, Mexico: Dumble, 271.
- San Lorenzo formation, Oligocene, California: Clark and Arnold, 173.
- San Lorenzo series, Oligocene, California: Clark, 172.
- San Luis formation, Mesozoic, California: Davis, 230.
- San Rafael, Tertiary, Mexico: Dumble, 271.
- San Ramon formation, Oligocene, California: Clark, 172.
- San Sebastian shale, Tertiary, Porto Rico: Semmes, 845.
- Santa Anna bed, Carboniferous, Texas: Drake, 266.
- Santa Anna Branch bed, Carboniferous, Texas: Drake, 266.
- Santa Margarita formation, Miocene, California: English, 294.
- Sardis terrace deposits, Mississippi Valley: Shaw, 850.
- Satsop formation, Pleistocene, Oregon: Smith, 884.
- Sauquoit beds, Silurian, New York: Chadwick, 158.
- Sausalito chert, Mesozoic, California: Davis, 230.
- Saxon conglomerate member, Devonian, Pennsylvania: Butts, 142.
- Schroepel shale, Silurian, New York: Chadwick, 158.
- Scranton shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Selma chalk, Cretaceous, Alabama: Hager, 387.
- Setters quartzite, Cambrian (?) Maryland: Clark *et al.*, 179.
- Severy shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Sevier shale, Ordovician Tennessee: Stose and Schrader, 923.
- Sewickley limestone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Sewickley (Lower) sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Sewickley (Upper) sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Sexton Creek limestone, Silurian, Missouri: Branson, 102.
- Shadrick Mill sandstone, Carboniferous, Texas: Drake, 266.
- Shady dolomite, Cambrian, Virginia: Hewett *et al.*, 433.
- Shakopee dolomite, Ordovician, Illinois: Cady, 143.
- Shandro shales, Cretaceous, Alberta: Allan, 12.
- Sharon sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Shasta series, Cretaceous, California: English, 294.
- Shawnee formation, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Shawnee formation, Pennsylvanian, Missouri: Branson, 102.
- Shenandoah limestone, Cambro-Ordovician, Maryland: Clark *et al.*, 179.
- Shimer gypsum member, Permian, Kansas: Moore and Haynes, 697.
- Shimer gypsum member, Permian, Oklahoma: Aurin, 27.
- Shinarump conglomerate, Triassic, Utah: Emery, 288.
- Short Creek oolite, Mississippian, Oklahoma: Perry, 752.
- Shriver limestone, Devonian, Pennsylvania: Butts, 142.
- Silver Hill formation Cambrian, Montana: Pardee, 738.

- Silver Peak group, Cambrian, California : Kirk, 519.
- Simpson shales, Devonian, Northwest Territory : Cameron, 146.
- Sioux quartzite, Algonian, Minnesota : Harder and Johnston, 403.
- Slave Point limestones, Devonian, Northwest Territory : Cameron, 146.
- Slocan series, Carboniferous, British Columbia : Bancroft, 38.
- Smithwick formation, Mississippian, Texas : Kempfer, 504.
- Smithwick shale, Mississippian, Texas : Hager, 388.
- Smoky Hill chalk member, Cretaceous, Kansas : Moore and Haynes, 697.
- Smoky River formation, Cretaceous, Alberta : McLearn, 610.
- Snake River basalt, Tertiary, Wyoming and Idaho : Schultz, 833.
- Sobrate sandstone, Miocene, California : Clark, 172.
- Sodus shale, Silurian, New York : Chadwick, 158.
- Speardish formation, Triassic (?), South Dakota : Darton, 228.
- Speck Mountain clay bed, Carboniferous, Texas : Drake, 266.
- Speck Mountain limestone bed, Carboniferous, Texas : Drake, 266.
- Spergen limestone, Mississippian, Missouri and Iowa : Van Tuyl, 972.
- Spergen ("Salem") limestone, Mississippian, Kentucky, Illinois, and Indiana : Butts, 140.
- Spring Creek bed, Carboniferous, Texas : Drake, 266.
- Stacy dolomite member, Ozarkian, Pennsylvania : Butts, 142.
- Stanton limestone, Oklahoma : Cullen, 213.
- Stanton limestone, Pennsylvanian, Oklahoma : Greene, 363.
- Stanton limestone member, Pennsylvanian, Kansas : Moore and Haynes, 697.
- Stanton (?) limestone, Carboniferous, Oklahoma : Clark, 174.
- Steele shale, Cretaceous, Wyoming : Bowen, 88 ; Wegemann, 1010.
- Sterling granite gneiss, pre-Carboniferous, Rhode Island : Hawkins, 412.
- Sterling Station iron ore, Silurian, New York : Chadwick, 158.
- Stewartsville group, Eocene, California : Clark, 171.
- Stonebreaker limestone, Carboniferous, Oklahoma : Bowen, 91.
- Stonebreaker limestone, Pennsylvanian, Oklahoma : Heald, 423, 424.
- Stonehouse formation, Silurian, Nova Scotia : McLearn, 611.
- Stones River limestone, Ordovician, Maryland : Clark *et al.*, 179.
- Strawn division, Carboniferous, Texas : Drake, 266.
- Strawn formation, Pennsylvanian, Texas : Kempfer, 504.
- Sucarnochee clay, Tertiary, Alabama : Hager, 387.
- Sundance formation, Jurassic, Great Plains : Schuchert, 830.
- Sundance formation, Jurassic, South Dakota : Darton, 228.
- Sundance formation, Jurassic, Wyoming : Bowen, 88 ; Condit, 202 ; Wegemann, 1010.
- Sunderland formation, Quaternary, Maryland : Clark *et al.*, 179.
- Sunderland group, Quaternary, Maryland : Little, 577.
- Supai formation, Carboniferous, Arizona : Schuchert, 828.
- Sycamore limestone, Oklahoma : Cullen, 213.
- Sylamore sandstone, Mississippian, Missouri : Branson, 102.
- Talbot formation, Quaternary, Maryland : Clark *et al.*, 179 ; Little, 577.
- Tallahatta buhrstone, Tertiary, Alabama : Hager, 387.
- Tallahatta buhrstone, Tertiary, Mississippi : Matteson, 684.
- Talpa bed, Carboniferous, Texas : Drake, 266.
- Talpa formation, Permian, Texas : Boele and Waite, 59.
- Tamasopa limestone, Cretaceous, Mexico : Dumble, 271.
- Tanlajas formation, Tertiary, Mexico : Dumble, 271.
- Tar Springs sandstone, Mississippian, Kentucky and Illinois : Butts, 140 ; Ulrich, 962.
- Taylor marl, Cretaceous, Texas : Stephenson, 909.
- Teapot sandstone member, Cretaceous, Wyoming : Wegemann, 1010.
- Tecumseh shale member, Pennsylvanian, Kansas : Moore and Haynes, 697.
- Tellico sandstone, Ordovician, Tennessee : Stose and Schrader, 923.
- Temapache limestones, Tertiary, Mexico : Dumble, 271.
- Tensleep sandstone, Carboniferous, Wyoming : Condit, 202.
- Tepeats sandstone, Cambrian, Arizona : Schuchert, 829.
- Tennus formation, Pennsylvanian, Texas : Baker and Bowman, 82.
- Tessey formation, Permian, Texas : Udden, 959.
- Teton formation, Triassic, Montana : Condit, 202.
- Texada formation, Carboniferous, British Columbia : Burwash, 135.
- Texana beds, Cretaceous, Texas : Drake, 266.
- Thaynes limestone, Triassic, Wyoming and Idaho : Schultz, 833.
- Thermopolis shale, Cretaceous, Wyoming : Bowen, 88 ; Moody and Tallaferrro, 688.
- Thomonde beds, Tertiary, Haiti : Jones, 490.

- Thornton fire clay, Pennsylvania, West Virginia: Reger and Teets, 778.
 Thorold sandstone, Silurian, New York: Chadwick, 158.
 Threeforks formation, Devonian, Wyoming: Schultz, 833.
 Tichenor limestone, Devonian, New York: Grabau, 355.
 Tiffany beds, Eocene, Colorado: Granger, 857.
 Timiskaming group, pre-Cambrian, Quebec: Wilson, 1058.
 Timiskaming series, pre-Cambrian, Quebec: Wilson, 1058.
 Tivola tongue, Eocene, Georgia: Cooke and Shearer, 206.
 Tedito (?) formation, Jurassic, Utah: Emery, 288.
 Tokio sand member, Cretaceous, Arkansas: Miser and Purdue, 679, 680.
 Tomstown limestone, Cambrian, Maryland: Clark *et al.*, 179.
 Tonoloway formation, Silurian, Maryland: Clark *et al.*, 179.
 Tonoloway limestone, Silurian, Pennsylvania: Butts, 142.
 Tookcarak diabase, pre-Cambrian, Belcher Islands, Canada: Moore, 693.
 Topeka limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
 Torpedo sandstone, Carboniferous, Oklahoma: Clark, 174; Hopkins, 454.
 Tradewater formation, Pennsylvanian, Kentucky: Lee, 552.
 Trenton limestone, Ordovician, Pennsylvania: Butts, 142.
 Trenton limestone, Ordovician, Wisconsin: Alden, 8.
 Trickham bed, Carboniferous, Texas: Drake, 266.
 Trinidad sandstone, Cretaceous, Colorado, New Mexico: Lee, 554.
 Trinity conglomerate, Cretaceous, Texas: Drake, 266.
 Trinity formation, Cretaceous, Arkansas: Miser and Purdue, 679, 680.
 Trinity sand, Cretaceous, Texas and Oklahoma: Stephenson, 909.
 Trinity sands, Cretaceous, Texas: Drake, 266.
 Tully limestone, Devonian, New York: Grabau, 355.
 Turkey Run limestone, Carboniferous, Oklahoma: Heald and Mather, 425.
 Tuscarora formation, Silurian, Maryland: Clark *et al.*, 179.
 Tuscarora formation, Tertiary, Alabama: Hager, 387.
 Tuscarora quartzite, Silurian, Pennsylvania: Butts, 142.
 Tuscaloosa formation, Cretaceous, Alabama: Hager, 387.
 Tuxedni sandstone, Jurassic, Alaska: Chapin, 168.
 Tuxpam beds, Tertiary, Mexico: Dumble, 271.
 Two Medicine formation, Cretaceous, Montana: Stebinger, 915.
 Twiggs clay member, Eocene, Georgia: Cooke and Shearer, 206.
 Twin Creek limestone, Jurassic, Wyoming and Idaho: Schultz, 833.
 Uffington shale, Pennsylvanian, West Virginia: Reger and Teets, 778.
 Uinta formation, Tertiary, Utah: Winchester, 1066.
 Usterian group, Devonian, Tennessee: Dunbar, 273.
 Ultima Thule gravel lentil, Cretaceous, Arkansas: Miser and Purdue, 679, 680.
 Umpqua formation, Eocene, Oregon: Smith, 884.
 Unico formation, Cambrian, Virginia: Hewett *et al.*, 433.
 Uniontown limestone, Pennsylvanian, West Virginia: Reger and Teets, 778.
 Uniontown sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
 Unkpapa sandstone, Jurassic, South Dakota: Darton, 228.
 Vale formation, Permian, Texas: Beede and Waite, 59.
 Valera bed, Carboniferous, Texas: Drake, 266.
 Vallenar formation, Devonian, Alaska: Chapin, 167.
 Vanhornville sandstone, Silurian, New York: Chadwick, 158.
 Vaqueros sandstone, Miocene, California: English, 294.
 Vashon till, Pleistocene, British Columbia: Burwash, 135.
 Vermejo formation, Cretaceous, Colorado, New Mexico: Lee, 554.
 Verona iron ore, Silurian, New York: Chadwick, 158.
 Vicksburg group, Tertiary, Mississippi: Cooke, 206.
 Vicksburg limestone, Tertiary, Gulf coast: Matteson, 634.
 Victoria sandstone, Cretaceous, Alberta: Allan, 12.
 Vidrio formation, Permian, Texas: Udden, 959.
 Villas shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
 Vinales limestones, Jurassic, Cuba: De Golyer, 241.
 Viola limestone, Oklahoma: Cullen, 213.
 Virgelle sandstone, Cretaceous, Montana: Stebinger, 915.
 Virginia slate, pre-Cambrian, Minnesota: Harder and Johnston, 408.
 Vishnu formation, Archean, Arizona: Schuchert, 829.
 Wabauunsee formation, Pennsylvanian, Kansas: Moore and Haynes, 697.
 Wabauunsee formation, Pennsylvanian, Missouri: Branson, 102.
 Waldrup bed, Carboniferous, Texas: Drake, 266.

- Wall Creek sandstone member, Cretaceous, Wyoming: Wegemann, 1010.
- Walnut shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Walnut shaly member, Cretaceous, Texas and Oklahoma: Stephenson, 909.
- Wanipigow series, pre-Cambrian, Manitoba: Marshall, 621.
- Wapanucka limestone, Oklahoma: Cullen, 213.
- Warrior limestone, Cambrian, Pennsylvania: Butts, 142.
- Warsaw formation, Mississippian, Missouri and Iowa: Van Tuyl, 972.
- Warsaw limestone, Mississippian, Kentucky and Illinois: Butts, 140.
- Warsaw shales, Mississippian, Missouri: Branson, 102.
- Wasatch formation, Tertiary, Utah: Clark, 175; Winchester, 1066.
- Wasatch formation, Tertiary, Wyoming: Moody and Talliaferro, 688.
- Wasatch formation, Eocene, Wyoming: Wegemann, 1010.
- Washita group, Cretaceous, Texas and Oklahoma: Stephenson, 909.
- Watauga shale, Cambrian, Virginia: Hewett *et al.*, 433.
- Watt's Creek bed, Carboniferous, Texas: Drake, 266.
- Waubakee dolomite, Silurian, Wisconsin: Alden, 8.
- Waukesha beds, Silurian, Wisconsin: Alden, 8.
- Waynesboro formation, Cambrian, Pennsylvania: Butts, 142.
- Waynesboro shale and sandstone, Cambrian, Maryland: Clark *et al.*, 179.
- Weber quartzite, Pennsylvanian, Utah: Schultz, 834.
- Weisner quartzite, Cambrian, Georgia: Shearer, 858.
- Welch sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Wellington formation, Permian, Kansas: Moore and Haynes, 697.
- Wellington shales, Permian, Kansas: Perrine, 751.
- Wells formation, Carboniferous, Wyoming and Idaho: Schultz, 833.
- Weno clay member, Cretaceous, Texas: Stephenson, 909.
- Westerly granite, Rhode Island: Hawkins, 412.
- Weston sandstone, Pennsylvanian, West Virginia: Reger and Teets, 778.
- Weston shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Whitehorse sandstone member, Permian, Kansas: Moore and Haynes, 697.
- Whitehorse sandstone member, Permian, Oklahoma: Aurin, 27.
- Whitemud beds, Eocene, Saskatchewan: Davis, 238.
- White Pine shale, Mississippian, California: Kirk, 519.
- White River formation, Oligocene, North Dakota: Quirk, 772.
- White River group, Tertiary, South Dakota: Darton, 228.
- Whitewood limestone, Ordovician, South Dakota: Darton, 228.
- Wichita stage, Permian, Texas: Beede and White, 59.
- Wichita-Albany formation, Permian, Texas: Kempfer, 504.
- Wicomico formation, Quaternary, Maryland: Clark *et al.*, 179; Little, 577.
- Wilbarger Creek bed, Carboniferous, Texas: Drake, 266.
- Wilcox formation, Tertiary, Gulf coast: Matteson, 634.
- Wilcox group, Tertiary, Alabama: Hager, 387.
- Wild Horse limestone, Pennsylvanian, Oklahoma: Greene, 363.
- Willard shale member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Williamson shale, Silurian, New York: Chadwick, 158.
- Wills Creek formation, Silurian, Maryland: Clark *et al.*, 179.
- Wills Creek shale, Silurian, Pennsylvania: Butts, 142.
- Windom shale, Devonian, New York: Grabau, 355.
- Winfield limestone, Oklahoma: Cullen, 213.
- Winfield limestone member, Permian, Kansas: Moore and Haynes, 697.
- Wingate, Jurassic, Utah; Emery, 288.
- Winterset limestone, Pennsylvanian, Missouri: McCourt, 606; Wilson, 1057.
- Winterset limestone member, Pennsylvanian, Kansas: Moore and Haynes, 697.
- Wisconsin glaciation, Pleistocene, Wisconsin: Alden, 8.
- Wise formation, Pennsylvanian, Virginia: Hinds, 439.
- Wissahickon phyllites and schists, Ordovician (?), Maryland: Clark *et al.*, 179.
- Wolcott limestone, Silurian, New York: Chadwick, 158.
- Wolcott Furnace iron ore, Silurian, New York: Chadwick, 158.
- Wolfcamp formation, Permian (?), Texas: Udden, 959.
- Wolfcamp shale member, Permian, Texas: Udden, 959.

- Woodward formation, Carboniferous, Oklahoma: Obern, 718.
- Woodward formation, Permian, Kansas: Moore and Haynes, 697.
- Woodward formation, Permian, Oklahoma: Aurin, 27.
- Woonsocket Basin series, Carboniferous, Rhode Island: Hawkins, 412.
- Word formation, Permian, Texas: Udden, 959.
- Wreford limestone, Carboniferous, Oklahoma: Bowen, 91; Cullen, 213.
- Wreford limestone, Permian, Kansas: Perrine, 751.
- Wreford limestone member, Permian, Kansas: Moore and Haynes, 697.
- Yakima basalt, Tertiary, Washington: Schwennesen and Meinzer, 837.
- Yankeetown chert, Mississippian, Illinois: Ulrich, 962.
- Yazoo clay member, Alabama and Mississippi: Cooke, 205.
- Yegua formation, Tertiary, Texas: Matteson, 634.
- Yumuri limestone, Oligocene, Cuba: D'Golyer, 241.

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ALBERT B. FALL, Secretary

UNITED STATES GEOLOGICAL SURVEY

GEORGE OTIS SMITH, Director

BULLETIN 731

BIBLIOGRAPHY

OF

NORTH AMERICAN GEOLOGY

FOR

1919-1920

BY

JOHN M. NICKLES



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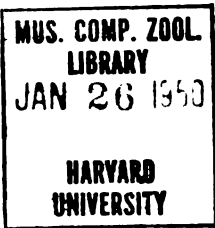
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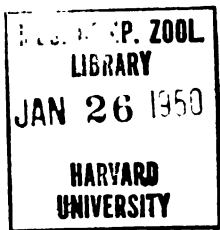
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CONTENTS.

	Page
Introduction	1
Serials examined	3
Bibliography	9
Index	147
Lists	241
Chemical analyses	241
Mineral analyses	242
Minerals described	242
Rocks described	244
Geologic formations described	244



BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY FOR 1919-1920.

By JOHN M. NICKLES.

INTRODUCTION.

The bibliography of North American geology, including paleontology, petrology, and mineralogy, for the years 1919 and 1920 contains publications on the geology of the Continent of North America and adjacent islands and on Panama and the Hawaiian Islands. It includes textbooks and papers of general character by American authors, but not those by foreign authors, except papers that appear in American publications.

The papers, with full title and medium of publication and explanatory note if the title is not fully self-explanatory, are listed under the names of their authors, which are arranged in alphabetic order. The author list is followed by an index to the literature listed.

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INDEX.

(The numbers refer to entries in the bibliography.)

- Abajo Mountains, Utah, structural features:** Thorpe, 1841.
Abitibi-Night Hawk gold area, Timiskaming district, Ontario: Knight, 1013.
Abrasive materials: Katz, 959.
 Garnet, North Carolina: Katz, 957.
Abstraction of potassium during sedimentation: Watson, 1959.
Acadia, paleogeography: Bailey, 53.
Addresses.
 Earth genesis: Chamberlin, 316.
 Earth sciences as the background of history: Merriam, 1266.
 Geology in the world war and after: Cross, 423.
 Great fossil reptiles of Alberta: Parks, 1450.
 Land and sea oscillations, major causes: Ulrich, 1891.
 National geological survey, functions and ideals: Ransome, 1510.
 Military contribution of civilian engineers: Smith, 1718.
 Place of paleontology among the sciences: Clarke, 353.
 Present tendencies in paleontology: Berry, 134.
 Réné Just Haüy: Whitlock, 2011.
 Sources and tendencies in American geology: Barrell, 70.
Adirondacks: Alling, 26.
Agricultural geology: Smith, 1726.
Ainsworth district, British Columbia: Schofield, 1619.
Alabama.
 Economic geology.
 Clay County: Prouty, 1500.
 Graphite: Brumell, 213; Prouty, 1499.
 Mineral production, 1920: Jones, 952.
 Oil to carbon ratio: Lloyd, 1113.
 Petroleum possibilities, Coastal Plain area: Brantley, 191; northern Alabama Semmes, 1656, 1657.
 Resources, southern Alabama: Harper, 750.
 Historical geology.
 Clay County: Prouty, 1500.
 Coastal Plain area: Brantley, 191.
 Cretaceous: Berry, 129.
 Crystalline and semicrystalline rocks, age: Prouty, 1498.
 Geologic map: Smith, 1713.
 Northern Alabama: Semmes, 1656, 1657.
 Paleontology.
 Cretaceous floras: Berry, 129.
 Hymenaea, Fayette County: Berry, 130.
 Physiographic geology.
 Pleistocene plain in Coastal Plain: Cleland, 365.
Alamosa Creek valley, Socorro County, New Mexico: Winchester, 2061.
Alaska.
 Areas described.
 Canning River region, northern Alaska: Leffingwell, 1074.
 Chichagof Island, west coast: Overbeck, 1411.
 Chulitna region: Capps, 294.
 Jack Bay district, Prince William Sound: Johnson, 930.
 Kahiltna Valley: Mertie, 1282.
 Kantishna region: Capps, 291.
 Kiwalik-Koyuk region: Harrington, 751.
 Kodiak Island: Maddren, 1198.
 Porcupine district: Eakin, 530.
 Talkeetna Mountains, western: Capps, 293.
 Tolstol district: Harrington, 752.

Alaska—Continued.*Economic geology.*

- Anvik-Andreafski region: Harrington, 751.
 Chichagof Island, west coast: Overbeck, 1411.
 Chistochina region: Chapin, 330.
 Chulitna region: Capps, 294.
 Chromite deposits: Diller, 500; Mertie, 1283; Kenai Peninsula: Gill, 652.
 Coal, Matanuska field: Chapin, 335.
 Nenana field: Martin, 1217.
 Copper, Kennecott: Bateman, 98; Anon., 2105.
 Fairbanks district: Chapin, 331.
 Gold, Anvik-Andreafski region: Harrington, 751.
 Chichagof Island: Overbeck, 1411.
 Porcupine district: Eakin, 530.
 Silver, copper, and lead: Martin, 1220.
 Tolovana district: Overbeck, 1413.
 Gypsum: Stone, 1785.
 Hot Springs district: Chapin, 333.
 Jack Bay district, Prince William Sound: Johnson, 930.
 Kahiltna Valley: Mertie, 1282.
 Kantishna region: Capps, 291.
 Kenai Peninsula: Johnson, 931.
 Kennecott copper deposits: Bateman, 98, 99.
 Kiwalik-Koyuk region, gold and platinum placers: Harrington, 755.
 Kodiak Island, beach placers: Maddren, 1198.
 Marble resources, southeastern Alaska: Burchard, 286.
 Matanuska coal fields: Martin, 1219.
 Mining industry: Martin, 1218, 1223.
 Molybdenite, Healy River: Chapin, 332.
 Nenana coal field: Martin, 1217.
 Nickel, Copper River valley: Overbeck, 1412.
 Northwestern Alaska: Cathcart, 305.
 Palladium, Prince of Wales Island: Campbell, 278.
 Porcupine district: Eakin, 530.
 Prince William Sound: Johnson, 929.
 Ruby district, tin: Chapin, 334.
 Salt-Chuck palladium-copper mine, Prince of Wales Island: Mertie, 1284.
 Seward Peninsula, graphite: Harrington, 754; tin: Harrington, 753.
 Talkeetna Mountains, western: Capps, 293.
 Tin, Lost River district: Fearing, 577.
 Tolstoi district: Harrington, 752.
 Unalaska and Akun islands, sulphur; Maddren, 1197.
 Willow Creek district, gold lode mining: Capps, 292; Chapin, 336.

Historical geology.

- Anvik-Andreafski region: Harrington, 751.
 Canning River region, northern Alaska: Leffingwell, 1074.
 Chistochina region: Chapin, 330.
 Glaciation, Paleozoic, southeastern Alaska: Kirk, 1011.
 Kahiltna Valley: Mertie, 1282.
 Kantishna region: Capps, 291.
 Kennecott: Bateman, 98.
 Kiwalik-Koyuk region: Harrington, 755.
 Kodiak Island: Maddren, 1198.
 Matanuska coal fields: Martin, 1219.
 Paleoclimatology: Blackwelder, 151.
 Pliocene: Dall, 451.
 Porcupine district: Eakin, 530.
 Pribilof Islands: Hanna, 741.
 Tolstoi district: Harrington, 752.

Paleontology.

- Pliocene and Pleistocene: Dall, 451.
 Pribilof Islands: Hanna, 741.
 Tertiary, Pribilof Islands: Dall, 450

Physical geology.

- Bogoslof Islands: Friedlaender, 624.
 Glacial erosion: Crosby, 420.
 Glacier studies: Chamberlin, 315.

Alaska—Continued.*Physical geology—Continued.*

Katmai region: Fenner, 578.

Katmai Volcano: Griggs, 712; eruption: Fenner, 579; Griggs, 711.

Klutian Glacier: Lambert, 1048.

Mageik landslide, Katmai district: Griggs, 718.

Valley of Ten Thousand Smokes: Shipley, 1694; temperature inversions in fumaroles: Sosman, 1740.

Volcanic emanations and incrustations: Shipley, 1795.

Physiographic geology.

Canning River region, northern Alaska: Leffingwell, 1074.

Katmai region: Fenner, 579.

Stream piracy, Tolovana and Hess River basins: Mertie, 1281.

Alberta.*Areas described.*

Little Smoky River: McLearn, 1190.

Economic geology.

Bituminous sands, northern Alberta: Ellis, 547.

Coal, Brule Lake region: MacVicar, 1196.

Highwood area: Rose, 1576.

Gas and oil fields: Dowling, 514.

Natural gas: Dowling, 516.

Mineral resources: Allan, 19.

Oil possibilities, Great Plains: Dowling, 517.

Peace River oil: Rutledge, 1590.

Petroleum, occurrence: Coste, 411; Dowling, 518; western Alberta: Purdy, 1501.

Historical geology.

Borings: Dowling, 515.

Brule Lake region: MacVicar, 1196.

Cordillera: Burwash, 249.

Correlation: Dowling, 514.

Cretaceous, lower Smoky River: McLearn, 1187.

Peace and Athabaska valleys: McLearn, 1188.

Crowsnest coal field, northern part: Rose, 1575.

Devonian, central basin: Dowling, 517.

Glacier Lake section: Walcott, 1928.

Highwood coal area: Rose, 1576.

Jasper Park region: Keyes, 985.

Southern and central Alberta: Slipper, 1712.

Southwestern Alberta: Stewart, 1766.

Swan Hills, Lesser Slave Lake district: Allan, 20.

Western Alberta: Purdy, 1501.

Paleontology.

Edmontosaurus: Lambe, 1049.

Dinosaurs: Matthew, 1246; Belly River beds: Lambe, 1050; Parks, 1451.

Kritosaurus, Belly River formation: Parks, 1452.

Pelecypoda, Cretaceous: McLearn, 1189, 1191.

Reptilia: Parks, 1450.

Physical geology.

Southwestern Alberta: Stewart, 1766.

Physiographic geology.

Lake Athabasca, origin: Alcock, 15.

Southwestern Alberta: Stewart, 1766.

Algae.

Middle Cambrian: Walcott, 1931.

Pre-Cambrian and Carboniferous: Twenhofel, 1869.

West Indies, Tertiary calcareous: Howe, 922.

Algonkian. See Pre-Cambrian.**Alidade, telescopic, manipulation: Mather, 1225.****Alkali.**

Nebraska: Barbour, 67.

Alpine structures, Jasper Park, Alberta: Keyes, 985.**Aluminum: Hill, 825, 826.****Amber, origin: Black, 150.****Ammonites. See Cephalopoda.****Amphicoelias: Osborn, 1406.**

Amphibia.

Labyrinthodont thoracic shield: Case, 302.

Wyoming, Lysite beds, Ototriton: Loomis, 1122.

Anguilla.

Paleontology.

Tertiary calcareous Algae: Howe, 872.

Anthosoa.

Cannonball fauna: Vaughan, 1916.

Heterolasma, Silurian, Michigan: Ehlers, 540.

West Indies: Vaughan, 1909.

Antigua.

Geology: Thomas, 1831.

Paleontology.

Tertiary calcareous Algae: Howe, 872.

Petrology.

Rhyolitic pebbles: Harrison, 760.

Antillean fauna, origin: Matthew, 1239.

Antimony: Bastin, 94.

Idaho: Thomson, 1839; Pine Creek district: Jones, 944.

Anvik-Andreafski region, Alaska: Harrington, 751.

Appalachian oil and gas fields, geology: Mills, 1813.

Appalachian oil field: Reeder & Company, 1524.

Arachnida.

Eurypterid horizon, New York: Chadwick, 307.

Aragonite deposited from sea water: Wells, 1982.

Arctic regions.

Historical geology.

Ellesmere Land: Holtedahl, 850.

Argonaut gold mine, Ontario: Knight, 1020.

Arizona.

United State Geological Survey publications relating to Arizona: Jenkins, 900.

Areas described.

Jerome district, Yavapai County: Reber, 1522.

Ray-Miami region: Ransome, 1507.

San Carlos Indian Reservation: Schwennesen, 1640.

Economic geology.

Amole district: Allen, 23.

Barytes: Allen, 22.

Cave Creek district: Lewis, 1095.

Copper: Tovote, 1855.

Jerome district: Mitchell, 1325; Rice, 1542.

Ray-Miami region: Ransome, 1507.

Copper ore minerals, vertical distribution in Junction mine, Warren district: Mitchell, 1323.

Copper schist deposits: Crampton, 414.

Field tests for common metals: Fansett, 569.

Gold, silver, copper, lead, and zinc: Helkes, 784, 786.

Gypsum: Stone, 1785.

Iron ore, magmatic, Eureka district: Ball, 60.

Jerome district, Yavapai County: Reber, 1522.

Manganese: Jones, 946; Colorado River desert region: Jones, 949.

Ore deposits: Tovote, 1856; age and classification: Wilson, 2055.

Salt deposits: Phalen, 1469.

Tucson and Amole Mountains: Jenkins, 901.

Warren district: Mitchell, 1322.

Historical geology.

Bright Angel quadrangle, geologic history: Noble, 1376.

Cave Creek district: Lewis, 1095.

Gila region: Ross, 1570.

Papago country, southwestern Arizona: Bryan, 218.

Permian-Triassic, northwestern Arizona: Shimer, 1693.

Pre-Moenkopi unconformity, Colorado Plateau: Dake, 444.

Ray-Miami region: Ransome, 1507.

Tucson and Amole Mountains: Jenkins, 901.

Warren district: Mitchell, 1322.

Arizona—Continued.*Mineralogy.*

- Flagstaffite: Guild, 722.
- Higginsite, Bisbee: Palache, 1423.
- Ray-Miami region: Ransome, 1507.
- Yuma County: Foshag, 612.

Petrology.

- Jerome ores: Rice, 1542.

Physiographic geology.

- Grand Canyon district: Noble, 1376.
- Meteor Mountain: Boot, 168.
- Papago country, southwestern Arizona: Bryan, 218.
- Rock tanks and charcos, origia: Bryan, 215.
- San Carlos Indian Reservation: Schwennesen, 1640.

Underground water.

- San Carlos Indian Reservation: Schwennesen, 1640.

Arkansas.

- Geological surveys: Branner, 188.

Economic geology.

- General: Ferguson, 582.
- Gypsum: Stone, 1785.
- Manganese: Stose, 1792; Batesville district: Miser, 1316, 1320.
- Mineral resources: Ferguson, 582.
- Road-making materials: Branner, 189.

Historical geology.

- General: Ferguson, 582; Miser, 1319.
- Mississippian tuff, Ouachita Mountains: Miser, 1318.

Mineralogy.

- Hausmannite, Batesville district: Miser, 1317.

Arsenic: Hill, 820, 824.

Artesian waters and wells. *See* Underground water.

Arthropoda.

- Phylogeny: Raymond, 1519.

Asbestos: Diller, 502.

- Quebec: Lynch, 1151.

Asphalt: Osbon, 1401.

- Bibliography: Osbon, 1401.

Associations, meetings.

- American Association for the Advancement of Science, Section E, St. Louis meeting, 1919: Chamberlin, 314.
- Geological Society of America, 31st annual meeting, Baltimore: Hovey, 869; 32d annual meeting, Boston: Hovey, 870.
- Cordilleran section, meetings: Taff, 1800, 1810, 1811: nineteenth meeting: Louderback, 1127.
- Mineralogical Society of America, organization: Rogers, 1564; Whitlock, 2015.
- Paleontological Society, Baltimore meeting, 1918: Bassler, 91; eleventh annual meeting, Boston: Bassler, 92.
- Pacific coast section, ninth meeting: Stock, 1769.
- State Geologists, Alabama meeting: Watson, 1964.

Athabaska series: Alcock, 14.

Athapapuskow Lake district, Manitoba: Bruce, 207.

Atikokania: Rothpletz, 1582.

Aulacera: Schuchert, 1626.

Aves: Ballou, 68.

Bacteria, iron-depositing: Harder, 745.

Banded clays: Sayles, 1606.

Barbados.*Petrology.*

- Coral limestones, minerals in: Harrison, 758.

Physical geology.

- Soils, genesis: Harrison, 759.

Barite: Allen, 22; Stose, 1791.

- Arizona: Allen, 22.

- Georgia: Hull, 880.

- Magmatic origin: Lewis, 1097.

- Missouri: Tarr, 1817.

- Tennessee, eastern: Gordon, 674.

152 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1919-1920.

- Barkley Sound, Vancouver Island, British Columbia: Dolmage, 506.
 Barometric surveying in petroleum mapping: Lahee 1045.
 Barosaurus: Lull, 1145.
 Barytes. *See* Barite.
 Batesville district, Arkansas: Miser, 1320.
 Bathylitha. *See* Intrusions.
 Batrachia. *See* Amphibia.
 Bauxite: Hill, 825, 826.
 Beaches. *See also* Shore lines; Terraces.
 Alaska: Dall, 451.
 Illinois, Chicago area: Salisbury, 1594.
 Beatrice: Schuchert, 1626.
 Belcher Islands, Hudson Bay, iron deposits: Moore, 1341.
 Belt fauna: Rothplets, 1581.
 Belt formation, Helena, Montana: Rothplets, 1581.
 Bend formation, Texas: Girty, 659.
 Ben Nevis gold area, Ontario: Knight, 1019.
 Beryl crystal, Black Hills: Waldschmidt, 1933.
 Bindheimite as an ore mineral: Shannon, 1663.
 Bibliography.
 Arizona: Jenkins, 900; Ray-Miami region: Ransome, 1507.
 Asphalt: Osbon, 1401.
 Barrell, Joseph, writings: Schuchert, 1631.
 Becker, G. F., writings: Day, 478.
 Black Hills region: O'Harra, 1389.
 Broadhead, G. C., writings: Keyes, 966.
 Canada, Geological Survey publications: Ferrier, 537.
 Coal, Kentucky: Jillson, 915.
 Colorado, north central, foothills formation: Henderson, 795.
 northeastern, Cretaceous: Henderson, 794.
 western, mineral deposits: Aurand, 49.
 Crinoidea Flexibilia: Springer, 1748.
 Cuba, carbonaceous materials: Ortega, 1398.
 Eastman, C. E., writings: Dean, 480.
 Florida: Sellards, 1647; human remains: Sellards, 1645.
 Fluorspar deposits: Aurand, 48.
 Gilbert, G. K., writings: Mendenhall, 1262.
 Glass sands: Richardson, 1547.
 Greenland: Bøggild, 157.
 Gypsum: Stone, 1785.
 Hitchcock, C. H., writings: Upham, 1396.
 Human remains, Vero, Florida: Sellards, 1645.
 Iron depositing bacteria: Harder, 745.
 Irving, J. D., writings: Kemp, 970.
 Jillson, W. D., writings: Jillson 923.
 Julien, A. A., writings: Kemp, 974.
 Kentucky: Miller, 1293; coal: Jillson, 916, 922; petroleum, natural gas, asphalt and oil shale: Jillson, 909, 922.
 Lambe, L. M., writings: Kindle, 1009.
 Manganese: Harder, 746; Hewett, 810; Mullenburg, 1355; Wheeler, 1263.
 Maryland, Cambrian and Ordovician: Bassler, 90.
 Mell, P. H., writings: Calhoun, 273.
 Mesozoic and Cenozoic plants. catalog: Knowlton. 1027.

Bibliography—Continued.

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 Ripple mark : Bucher, 222.
 Rogers, G. S., writings : Kemp, 975.
 Salt : Phalen, 1469.
 Seismology, Mexico : Muñoz Lumbier, 1359.
 Texas, Fredericksburg and Washita formations : Adkins, 7.
 Weno and Pawpaw formations : Adkins, 6.
 Trilobites : Raymond, 1520.
 Tungsten, United States : Hess, 800.
 U. S. Geological Survey : Inst. Govt. Research, 891.
 Utah, ore deposits : Butler, 255.
 Van Hise, C. E., writings : Leith, 1080.
 Walcott, C. D., writings : Anon., 2104.
 Washington, mineral resources : Fischer, 596.
 Stevens County : Weaver, 1970.
 Williams, H. S., writings : Cleland, 861.

Biography.

- Barrell, Joseph : Schuchert, 1629, 1680, 1631 ; Willis, 2046.
 Becker, G. F. : Day, 477, 478.
 Billings, W. R. : Kindle, 1010.
 Broadhead, G. C. : Keyes, 986.
 Clark, W. B. : Emerson, 548.
 Eastman, C. R. : Dean, 479, 480 ; Holland, 848.
 Gilbert, G. K. : Andrews, 31 ; Barrell, 69 ; Fairchild, 559 ; Mendenhall, 1262 ;
 Merriam, 1263.
 Hall, James : Clarke, 859.
 Haüy, R. J. : Whitlock, 2011.
 Hidden, W. E. : Kuns, 1089.
 Hitchcock, C. H. : Upham, 1896.
 Howell, E. E. : Fairchild, 560.
 Iddings, J. P. : Merrill, 1278.
 Irving, J. D. : Kemp, 970.
 Julien, A. A. : Kemp, 974.
 Lambe, L. M. : Kindle, 1003, 1009.
 Lucas, A. F. : McBeth, 1154.
 Mell, P. H. : Calhoun, 273.
 Merriam, J. C. : Matthew, 1244.
 Miller, W. G. : Rickard, 1550.
 Moses, A. J. : Kuns, 1040 ; Luquer, 1150 ; Whitlock, 2018, 2019.
 Pirsson, L. V. : Cross, 424 ; Iddings, 887.
 Powell, J. W., memorial : Dellenbaugh, 487.
 Purdue, A. H. : Ashley, 46.
 Raymond, R. W. : Ingalls, 889 ; Rickard, 1552.
 Rogers, G. S. : Kemp, 975.
 Van Hise, C. E. : Leith, 1080 ; Wolff, 2073.
 Walcott, C. D. : Anon., 2104.
 Ward, H. A. : Fairchild, 558.
 Williams, H. S. : Cleland, 861 ; Gregory, 700.
 Williston, S. W. : Lull, 1144 ; Osborn, 1402, 1403 ; Shimer, 1692.
 Winchell, H. V. : Rickard, 1549.

Bismuth : Hill, 820, 824.

Bituminous sands.

Alberta, northern : Ellis, 547.

Blastoidea.

Chester fauna : Weller, 1973.

Borings.

- Alabama, Coastal Plain : Brantley, 191.
 northern : Semmes, 1656, 1657.
 California, San Diego County : Ellis, 542.
 Canada, Prairie provinces : Dowling, 515.
 Deep wells : Anon., 2107.
 Examination of well cuttings : Trager, 1858.
 Illinois, Colchester and Macomb quadrangles : Hinds, 832.
 Goodhope and La Harpe quadrangles : Nebel, 1368.
 northeastern : Anderson, 80.

Borings—Continued.

- Indiana : Logan, 1120.
- Iowa, Atlantic : Tilton, 1847.
- Pocahontas County, Laurens : Cable, 264.
- Kansas, Syracuse and Lakin quadrangles : Darton, 462.
- Kentucky : Jillson, 903, 922 ; Shaw, 1680.
- Allen County : Jillson, 913.
- Breathitt and Knox counties : Jillson, 914.
- eastern : Jillson, 917, 918.
- southeastern : Jillson, 910.
- Stinking Creek region : Jillson, 904.
- Warren County : Jillson, 919 ; Laird, 1047.
- Logmeter : Burton, 247.
- Mississippi : Lowe, 1139.
- Montana, Glendive : Bowen, 171.
- Vananda : Bowen, 171.
- Nevada, Steptoe Valley : Clark, 347.
- New Mexico : Ellis, 545.
- Oklahoma : Bloesch, 155 ; Shaw, 1685.
- Ontario, southwestern : Williams, 2038.
- Tennessee, Sumner County : Mather, 1227.
- Texas, Amarillo region : Gould, 678.
- Bexar County : Sellards, 1653.
- Brown County : Waite, 1924.
- central : Matteson, 1231.
- Tarrant County : Winton, 2062.
- West Point salt dome : De Golyer, 485.
- United States : Phalen, 1469.
- Virginia, Tazewell County : Harnsberger, 749.
- West Virginia, Marlon County, deepest well : White, 2006.
- Wyoming, Cambria : Hancock, 736.
- Lance Creek field : Hancock, 737.
- Rock Springs area, Sweetwater County : Schultz, 1639.
- Upton-Thornton oil field : Hancock, 735.

Botany, fossil. *See* Paleobotany.

Boulders.

- Iowa, Kansan drift : Kay, 962.
- Kansas, southeastern, granite boulders : Twenhofel, 1868.
- Boyer Valley, Iowa : Lees, 1070.

Brachiopoda.

- Derbya : Price, 1492.
- Etheridgina : Greger, 699.
- Platystrophia : McEwan, 1173.
- Pocono fauna : Price, 1493.
- Syringothyris : North, 1377.

Breccia.

- Iowa, Wapsipinicon breccias : Norton, 1381.
- New York, Rochester : Giles, 651.

British Columbia.*Areas described.*

- Ainsworth district : Schofield, 1619.
- Barkley Sound, Vancouver Island : Dolmage, 506.
- Britannia area : Schofield, 1616.
- Cariboo district : MacKay, 1179.
- Coquihalla area : Camsell, 286.
- Copper Mountain, Gun Creek : Camsell, 284.
- Hazleton district : O'Neill, 1390.
- Lillooet-Prince George region : Reinecke, 1538.
- Quatsino Sound district, Vancouver Island : Dolmage, 505.
- Salmon River district : O'Neill, 1393.
- Slocan area : Bancroft, 66.
- Sunlooh copper district, Vancouver Island : Dolmage, 507.

Economic geology.

- Alice Arm district : Davis, 467.
- Cariboo gold fields : MacKay, 1177, 1178.
- Clinton district : Reinecke, 1537.
- Copper, Hidden Creek mine : Campbell, 280.

British Columbia—Continued.*Economic geology* Continued.

- Copper sulphides, La Fleur Mountain: McLaughlin, 1183.
 Crowsnest Pass coal field: Strachan, 1796.
 Gold: Camsell, 288; Coquihalla area: Camsell, 286.
 Granby mines, Phoenix: Campbell, 277.
 Hazelton district: O'Neill, 1890.
 Hidden Creek mine, Granby Bay: Campbell, 280.
 Kamloops Lake, mercury deposits: Camsell, 282.
 Lardeau area: Bancroft, 65.
 Lillooet-Prince George region: Reinecke, 1538.
 Mesozoic mineralization: Schofield, 1688.
 Mining industry, 1918, 1919: Robertson, 1557, 1558.
 Oil and gas possibilities, northeastern British Columbia: Stewart, 1767.
 Oil possibilities, Vancouver region: Camsell, 283.
 Placer mines, Cariboo district: Tyrrell, 1876.
 Platinum: Camsell, 285; Uglow, 1889; Tulameen district: Macaulay, 1158.
 Quatsino Sound district, Vancouver Island: Dolmage, 505.
 Salmon River district: Prior, 1496.
 Silver, Stump Lake: Camsell, 287.
 Silver-lead deposits, Ainsworth district: Schofield, 1619.
 Stewart district: Campbell, 279; silver ores: Dolmage, 508.
 Sunloch copper district, Vancouver Island: Dolmage, 507.
 Taseko Valley iron deposits: Brewer, 194.

Historical geology.

- Ainsworth district: Schofield, 1617.
 Copper Mountain, Gun Creek: Camsell, 284.
 Cordillera: Burwash, 249.
 Mesozoic: Schofield, 1618; Hedley: Schofield, 1620.
 Northeastern British Columbia: Stewart, 1767.
 Tulameen district: Macaulay, 1153.
 Vancouver region: Camsell, 283.

Mineralogy.

- Axinite, Nickel Plate Mountain: Poltevin, 1479.
 Calamine, Ainsworth: Poltevin, 1478.
 Cerussite, Moyle: Poltevin, 1480.
 Ferrierite, Kamloops Lake: Graham, 692.
 H. B. mine, Salmo: Walker, 1936.

Palaeontology.

- Algae, Middle Cambrian: Walcott, 1931.
 Spongiae, Middle Cambrian: Walcott, 1932.

Petrology.

- Gabbros, East Sooke and Rocky Point, Vancouver Island: Cooke, 402.

Physical geology.

- Earthquake, December 6, 1918: Denison, 493.
 Glaciation: Tyrrell, 1875.
 Yoho Glacier, movement, 1917-19: Wheeler, 1987.

Physiographic geology.

- Purcell trench: Schofield, 1621.

Bromine: Stone, 1779.

Bryozoa.

- Tertiary: Canu, 290.
 West Indies: Canu, 289.

Building Stone. *See* Granite; Limestone; Sandstone; Stone.

Burnthill Brook area, New Brunswick: Young, 2097.

Butler salt dome, Texas: Powers, 1484.

Cadmium: Siebenthal, 1697, 1698, 1702.

Calcination volcanoes: Hobbs, 835.

Calcium chloride: Stone, 1779.

California.*Areas described.*

- Laufair Valley, San Bernardino County: Thompson, 1837.
 San Diego County, western part: Ellis, 542.
 Santa Ynez River district, Santa Barbara County: Kew, 980.
 Simi Valley, southern California: Kew, 979.
 Sunset-Midway oil field: Pack, 1415.

California—Continued.*Economic geology.*

- Chromite deposits: Miller, 500.
 Clay: Boalich, 156.
 Economic minerals: Castello, 304.
 Gold, silver, copper, lead, and zinc: Yale, 2093, 2095.
 Gypsum: Stone, 1735.
 Kelly silver mine, Randesburg, Kern County: Carpenter, 297.
 Magnesite: Phalen, 1470.
 Manganese, southeastern California: Jones, 947.
 Mineral production, 1918, 1919: Bradley, 186, 187.
 Nevada County: Mac Boyle, 1156.
 Oil, gas, and water, relations in Sunset-Midway field: Rogers, 1566.
 Oil-field waters: Rogers, 1567.
 Petroleum: McLaughlin, 1185.
 Santa Clara Valley: Reinhard, 1539.
 Simi Valley: Kew, 979.
 Sunset-Midway oil field: Pack, 1415.
 Platinum and allied metals: Logan, 1115.
 Plumas County: Mac Boyle, 1157.
 Salt deposits: Phalen, 1469.
 Sierra County: Mac Boyle, 1158.
 Sunset-Midway oil field: Pack, 1415.
 Vein crossings, Grass Valley: Hoover, 853.

Historical geology.

- Eocene divisions: Clark, 341.
 Meganos group: Clark, 342.
 Miocene, Santa Barbara County: Jordan, 956.
 Mohave Desert: Merriam, 1264.
 Nevada County: Mac Boyle, 1156.
 Plumas County: Mac Boyle, 1157.
 Santa Clara Valley: Reinhard, 1539.
 Santa Ynez River district, Santa Barbara County: Kew, 980.
 Sierra County: Mac Boyle, 1158.
 Sunset-Midway oil field: Pack, 1415.

Mineralogy.

- Aphthalite, Searles Lake: Foshag, 616.
 Boussingaultite, South Mountain, Santa Paula: Larsen, 1058.
 Chlorite, chromiferous: Shannon, 1675.
 Colemanite pseudomorphous after inyoite, Death Valley: Rogers, 1562.
 Economic minerals: Castello, 304.
 Manganese minerals, San Jose: Rogers, 1563.
 Minerals in limestone formed by contact metamorphism, Crestmore, Riverside County: Eakle, 531.
 Plazolite, Riverside: Foshag, 619.
 Sulphohalite, Searles Lake: Foshag, 615.
 Thauasite and spurrite, Crestmore: Foshag, 617.
 Vonsenite, Riverside: Eakle, 532.

Paleontology.

- Diatomaceae, Lompoc, Santa Barbara County: Yermoloff, 2096.
 Echinoidea: Kew, 981.
 Mohave Desert: Merriam, 1264.
 Mylodon harlani, mounted skeleton: Stock, 1772.
 Placsa, Lompoc: Jordan, 955; southern California: Jordan, 954.
 Rancho La Brea fossils, Los Angeles County: Wyman, 2092.
 Tertiary and Quaternary faunas: Smith, 1724.
 Tertiary vertebrate fauna, southern coast ranges: Stock, 1770.
 Xyne grex, Santa Barbara County: Jordan, 957.

Physical geology.

- Coast ranges, mobility: Lawson, 1062; structure: Willis, 2048.
 Earthquakes: Townley, 1857.
 Inglewood, June 21 1920: Taber,, 1807.
 Los Angeles region: Arnold, 38.
 recent: Palmer, 1480.
 registration: Davis, 468-471; Bond, 165.
 San Jose: Vickery, 1918.
 southern California: Mulholland, 1858; Taber, 1808.
 1918, 1919: Palmer, 1428, 1429.

California—Continued.**Physical geology—Continued.**

- Fault system at southern end of Sierra Nevada: Buwalda, 260.
- Rifts of southern California: Hill, 829.
- San Francisco Bay sediments: Louderback, 1125.
- Sierra Nevada, postglacial denudation: Muir, 1356.

Physiographic geology.

- Cockscomb Crest, Yosemite: Matthes, 1233.
- Rifts of southern California: Hill, 829.

Underground water.

- Lanfair Valley, San Bernardino County: Thompson, 1837.
- Oil-field waters: Rogers, 1567.
- Pahrump, Mesquite, and Ivanpah valleys: Waring, 1952.
- San Diego County, western part: Ellis, 542.
- San Jacinto and Temecula basins: Waring, 1950.

Camarasaurus: Osborn, 1406, 1407.

Cambrian. See also Paleontology, Cambrian.

- Acadia: Bailey, 53.
- Alberta, Glacier Lake section: Walcott, 1923.
- Arctic regions, Ellesmere Land: Høltedahl, 850.
- Arizona, Ray-Miami region: Ransome, 1507.
- Tucson and Amole Mountains: Jenkins, 901.
- Arkansas: Miser, 1319.
- Belt formation, Helena, Montana: Rothpletz, 1581.
- Bibliographic studies: Reaser, 1540.
- Canadian Rockies: Burwash, 249.
- Georgia: McCallie, 1159.
- Greenland: Bøggild, 157; northwestern: Koch, 1033.
- Idaho, Fort Hall Indian Reservation: Mansfield, 1211.
- Maryland: Bassler, 90.
- Minnesota: Grout, 715.
- Montana, Fergus County: Freeman, 622.
- Helena region: Rothpletz, 1581.
- New Brunswick: Bailey, 52.
- Newfoundland: Howell, 873.
- New Mexico: Keyes, 993.
- eastern: Baker, 55.
- New York, Canton quadrangle: Chadwick, 810.
- Lake Clear region: Ailing, 26.
- Quebec, Coleraine area: Knox, 1030.
- Taconic system resurrected: Schuchert, 1625.
- Texas: Udden, 1880.
- Utah: Butler, 255.
- Tintic district: Lindgren, 1105.
- Vermont Green Mountains, western flank: Dale, 446.
- Northfield: Richardson, 1545.
- Roxbury: Richardson, 1546.
- Virginia, Blue Ridge, west foot: Stose, 1786.
- Wisconsin, Tomah-Sparta quadrangles: Twenhofel, 1870.

Camp Devens area, Massachusetts: Atwood, 46.

Camp Dodge region, Iowa: Lee, 1069.

Canada (general). See also names of provinces.

- Mackenzie River basin: Camsell, 281.
- Geological Survey, publications, catalog: Ferrier, 587.
- Geological Survey, report: McInnes, 1175, 1176.

Economic geology.

- Apatite: Spence, 1745.
- Belcher Islands, Hudson Bay, iron deposits: Moore, 1841.
- Coal: Gray, 693; western Canada: White, 2009.
- Copper, Arctic Canada: O'Neill, 1392.
- Graphite: Spence, 1744.
- Helium in natural gases: McLennan, 1192.
- Mackenzie River basin: Camsell, 281.
- Manganese: Mackenzie, 1181.
- Mines Branch, report: Haanel, 725, 726.
- Oil, western provinces: Pearce, 1456.
- Oil possibilities, western Canada: Dowling, 520.

Canada (general)—Continued.

Economic geology—Continued.

Oil resources: Dowling, 519.

Ore bodies, occurrence in pre-Cambrian: Dougherty, 512.

Ore deposits of Arctic Canada: Moore, 1342.

Phosphate: Spence, 1745.

Platinum: Mackenzie, 1181; O'Neill, 1391.

Salt: Cole, 377, 378.

Titaniferous iron ores: Goodwin, 673.

Physiographic geology.

Glaciers, Rocky Mountains: Wheeler, 1986.

Relief map of Prairie provinces: Dowling, 513.

Rocky Mountain geosynclinal: Burwash, 250.

Canal Zone. *See* Panama.

Canning River region, northern Alaska: Leffingwell, 1074.

Cannonball fauna: Stanton, 1736; corals: Vauzhan, 1916.

Carboniferous. *See also* Paleontology, Carboniferous.

Acadia: Bailey, 53.

Alabama: Prouty, 1498.

northern: Semmes, 1656.

Alaska, Anvik-Andreafski region: Harrington, 731.

Canning River region: Leffingwell, 1074.

Chistochina region: Chapin, 830.

Porcupine district: Eakin, 530.

Allegheny formation, typical section: Swartz, 1808.

Arctic regions, Ellesmere Land: Høltedahl, 850.

Arizona, northwestern: Shiner, 1698.

Ray-Miami region: Ransome, 1507.

Arkansas: Miser, 1319.

British Columbia, Alnsworth district: Schonfeld, 1617, 1619.

Lillooet-Prince George region: Reinecke, 1538.

Selkirk Range: Schofield, 1621.

Slocan area: Bancroft, 66.

Chester series: Weller, 1974.

Colorado, Montezuma County, McElmo anticline: Coffin, 875.

north central, foothills formations: Henderson, 795.

Routt and Moffat counties: Perini, 1461.

Correlation, Texas-Kansas: Beede, 110.

Dighton conglomerate, origin: Perkins, 1462.

Georgia: McCallie, 1159.

Greenland: Böggild, 157.

Idaho, Fort Hall Indian Reservation: Mansfield, 1211.

Illinois, Brown County: Nebel, 1367.

Chester series: Weller, 1974, 1975.

Colchester and Macomb quadrangles: Hinds, 832.

Goodhope and La Harpe quadrangles: Nebel, 1368.

Hardin County: Weller, 1973.

Hennepin quadrangle: Cady, 207.

La Salle quadrangle: Cady, 267, 270.

Pike and Adams counties: Coryell, 410.

Saline and Gallatin counties: Cady, 268.

Indiana, Greene County, eastern: Malott, 1205.

Orange County, Chester formations: Hole, 847.

southern, Chester series: Malott, 1206.

Interior coal fields: Keyes, 983.

Iowa, Adair County: Gow, 679.

Cass County: Tilton, 1847.

Clarke County: Tilton, 1846.

Fort Dodge, Ste. Genevieve marls: Lees, 1072.

Ringgold County: Arey, 35.

southwestern: Smith, 1714.

Taylor County: Arey, 36.

Kansas: Moore, 1346, 1349.

Snider, 1736.

Allen and Neosho counties: Moore, 1347.

eastern: Fath, 575.

Elk City field: Boughton, 170.

Carboniferous—Continued.**Kansas—Continued.**

- Wilson and Montgomery counties: Moore, 1848.
- Wreford and Foraker limestones: Twenhofel, 1867.
- Kentucky: Jillson, 872; Miller, 1298.
- Allen County: Miller, 1297; Shaw, 1680.
- Barren County: Butts, 259.
- Breathitt and Knox counties: Jillson, 864.
- Johnson County, Paint Creek uplift: Rhodes, 1541.
- Kendrick shale: Jillson, 911.
- Magoffin County: Browning, 206.
- southeastern: Jillson, 910.
- Stinking Creek region: Jillson, 904.
- Warren County: Jillson, 919.
- Kinderhook group: Moore, 1343.
- Louisian vs. Mississippian: Keyes, 989.
- Maryland, coal measures: Swartz, 1804.
- Mid-Continent fields: Snider, 1736.
- Mississippi: Lowe, 1188.
- Mississippian tuff, Ouachita Mountains: Miser, 1818.
- Missouri: Branson, 190.
- Montana, Fergus County: Freeman, 622.
- Stanford hematite district: Westgate, 1985.
- New Brunswick: Bailey, 52.
- Burnthill Brook area: Young, 2097.
- New Mexico: Keyes, 993.
- Chaves County: Merritt, 1280.
- eastern: Baker, 55.
- Manzano group: Lee, 1068.
- northeastern: Garrett, 640.
- Pecos Valley: Semmes, 1658.
- Puertecito district: Wells, 1978.
- Taos Range: Gruner, 720.
- Ohio, Dunkard series: Stauffer, 1757.
- Muskingum County: Stout, 1794.
- Oklahoma: Bloesch, 155; Greene, 695.
- Caddo County: Clapp, 340.
- Hogshooter gas sand: Berger, 123.
- Osage Reservation: Bowen, 172; Goldman, 665, 666, 667; Heald, 777-780; Hopkins, 854; Robinson, 1559, 1560; Ross, 1578.
- Wreford and Foraker limestones: Twenhofel, 1867.
- Oregon: Smith, 1728.
- Paleozoic, late: Case, 299.
- Pre-Moenkopi unconformity, Colorado Plateau: Dake, 444.
- Tennessee, Overton County: Butts, 258.
- Rutherford County: Galloway, 683.
- Sumner County: Mather, 1227.
- Texas: Udden, 1880.
- Amarillo region: Gould, 678.
- Bend series: Girty, 659, 660; Moore, 1844.
- central: Matteson, 1231.
- Coke County red beds: Beede, 108, 109.
- Crockett County: Liddle, 1102.
- Diablo Plateau: Beede, 110.
- Ellenburger formation: Sellards, 1652.
- Hudspeth County: Beede, 111.

Carboniferous—Continued.

Wyoming, Maverick Springs: Collier, 389.

Thermopolis district: Collier, 387.

Caribbean region: Vaughan, 1910.

Cariboo gold fields, British Columbia: MacKay, 1178.

Carnotite, Colorado, southwestern: Burwell, 251.

Cartography.

Barometric surveying in petroleum mapping: Lahee, 1045.

Military and geologic mapping: Bateman, 96.

Plane-table: Bateman, 96.

Radian measures in plane-table mapping: Palmer, 1483.

Reconnaissance mapping: Fuller, 627.

Caves.

Mexico, Pedregal, caves in lava: Wittich, 2063.

Ohio, Put-in-Bay, origin: Cuttingham, 412.

Oregon, Josephine County: Williams, 2038.

South Dakota, Black Hills: Johnson, 1037.

Celestite, Ontario, Renfrew County, Bagot township: Wilson, 2053.

Cement materials: Burchard, 230, 234.

New York, Catskill region: Jones, 951.

Cenozoic Plantae, catalog: Knowlton, 1027.

Central America. *See also* Costa Rica, Guatemala, etc.

Cenozoic history: Vaughan, 1907.

Mesozoic history: Stanton, 1754.

Swamps, coastal: MacDonald, 1172.

Cephalopoda.

Cardioceratidae: Reeside, 1525.

Cuba, Jurassic ammonites: O'Connell, 1384.

Viñales, Jurassic: Sánchez Roig, 1595, 1596.

Holochoanites, genetic relations: Grabau, 683.

Mexico, Coahuila, Turonian ammonite fauna: Böse, 164.

Guerrero, Cretaceous: Burckhardt, 240.

Zacatecas, Jurassic: Burckhardt, 240.

New Mexico, Abo sandstone ammonoids: Böse, 163.

Perisphinctinae, coastal development: O'Connell, 1383.

Permo-Carboniferous ammonoids, Glass Mountains, Texas: Böse, 161.

Texas, Weno and Pawpaw formations: Adkins, 6.

Cerium: Watson, 1961.

Chalcopyrite deposits, northern Manitoba: Bruce, 211.

Chalk: Ward, 1946.

Changes of level. *See also* Beaches; Shore lines; Terraces.

Alaska: Dall, 451.

Causes, major: Ulrich, 1891.

Champ'ain submergence, depth along Maine coast: Meserve, 1289.

Coastal Plain, Quaternary: Vaughan, 1914.

Columbia Valley, Pleistocene submergence: Bretz, 192.

Coral reefs and the glacial period: Daly, 453.

Manitoba, Pleistocene: Johnston, 943.

Mexico, Lower California: Wittich, 2070.

New Hampshire, Quaternary: Goldthwait, 668.

New York, eastern: Fairchild, 556.

Genesee River region: Fairchild, 561.

Paleozoic oscillations: Ulrich, 1890.

Pleistocene: Daly, 452.

Post-glacial uplift of New England coastal region: Fairchild, 562, 563.

Post-Pleistocene: Daly, 458.

Quaternary: Daly, 455, 458.

Recent sinking of sea level: Daly, 457, 459.

Vermont, postglacial uplift: Fairchild, 557.

Charcos, origin: Bryan, 215.

Chemical analyses. *See list*, p. 241.**Chert.**

Indiana: Bennett, 121.

Origin: Twenhofel, 1867.

Wrexford and Foraker limestones: Twenhofel, 1867.

Chester series in Illinois: Weller, 1974.

Chrome, magnetic and nonmagnetic: Lewis, 1096.

Chrome iron ore.

Cuba, Burch, 229.
occurrences: Ross, 1580.

Chromite: Diller, 500, 501.

Alaska: Mertie, 1283.
Kenai Peninsula: Gill, 652.
British Columbia, Clinton district: Reinecke, 1537.
Lillooet-Prince George region: Reinecke, 1538.
Cuba: Burch, 228; Burchard, 235, 239.
San Miguel de los Baños: Suarez Murias, 1799.
Maryland: Singewald, 1708, 1709.
North Carolina: Lewis, 1098.

Chulitna region. Alaska: Capps, 294.**Classification.**

Coal, use classification: Ashley, 41.
Cycadophyta: Wieland, 2030.
Igneous rocks: Mathews, 1228; quantitative mineralogical classification: Johannsen, 928.
Mimetic crystals: Wherry, 1992.
Ore deposits: Tovote, 1856.
Pent deposits: Dachnowski, 440.
Rock classification for engineering: Pirsson, 1473; Smith, 1729.
Springs: Bryan, 216.

Clay.

British Columbia, Clinton district: Reinecke, 1537.
Lillooet-Prince George region: Reinecke, 1538.
California: Boalich, 156.
Composition: Somers, 1737.
Fire clays, northern Appalachian coal basin: Ashley, 44; Lovejoy, 1136.
High-grade American clays, occurrence: Ries, 1553, 1554.
Idaho: Skeels, 1711.
Illinois, Union County, Mountain Glen: St. Clair, 1592.
Indiana, Monroe County: Logan, 1117.
Microscopic examination: Somers, 1737.
Minnesota: Grout, 714.
Ontario, Abitibi and Mattagami rivers: Keele, 966.
northern: Keele, 965.
Pennsylvania, Monroe County, Saylorsburg, white clays: Peck, 1459.
white clay: Hice, 816.
Tennessee, western, ball clays: Schroeder, 1623.
Texas, eastern: Dumble, 524.
Virginia: Ries, 1555.

Climate, geologic. See Paleoclimatology.**Clinton district, British Columbia:** Reinecke, 1537.**Clinton iron ores, genesis:** Smyth, 1735.**Coal:** Leshar, 1087, 1088: Stevenson, 1764. See also Lignite.

Alaska, Matanuska field: Chapin, 335; Martin, 1219.
Nenana field: Martin, 1217.
Alberta, Brule Lake region: MacVicar, 1196.
Highwood area: Rose, 1576.
Appalachian field: Bryan, 220.
British Columbia, Crownsnest Pass field: Strachan, 1796.
Canada: Gray, 693; western: White, 2009.
Colorado, Mancos district: Collier, 386.
Compilation and composition of bituminous coals: Thiessen, 1829.
Composition: Thiessen, 1828.
Formation: Hackford, 728; Kendall, 978; and origin: Thiessen, 1827.
Geology: Finlay, 594.
Idaho, eastern: Mansfield, 1216.
Teton basin, Horseshoe district: Evans, 553.
Illinois, Colchester and Macomb quadrangles: Hinds, 832.
Hennepin quadrangle: Cady, 267.
La Salle quadrangle: Cady, 267.
low-sulphur coal: Cady, 271.
Saline and Gallatin counties: Cady, 268.

162 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1919-1920.

Coal—Continued.

- Indiana : Barrett, 82.
- Monroe County : Logan, 1116.
- Vigo County : Logan, 1121.
- Kentucky : Jillson, 922; Miller, 1298.
- bibliography : Jillson, 915.
- Clay County : Hodge, 840; Sexton Creek area : Russell, 1589.
- Goose Creek region : Hodge, 840.
- Kentucky River, north fork : Hodge, 839.
- Leslie and Harlan counties : Hodge, 838.
- low-sulphur coals : Jillson, 912.
- Magoffin County : Browning, 206.
- production : Jillson, 916.
- Stinking Creek region : Jillson, 904.
- Mexico, Sonora : Paredes, 1447.
- Missouri : Brodie, 200.
- Newfoundland : Haliburton, 732.
- Nova Scotia : Hayes, 771, 773.
- Ohio : Stout, 1795.
- Muskingum County : Stout, 1794.
- Oklahoma : Fuller, 629.
- Origin : Hippard, 838; Runner, 1587.
- Pennsylvania : Ashley, 43.
- low-sulphur coals : Chance, 324.
- Spore exines, use in correlation : Thiessen, 1830.
- Structure in Paleozoic bituminous coals : Thiessen, 1828, 1829.
- Sulphur in coal : Thiessen, 1825, 1826; geological aspects : Ashley, 42.
- Use classification : Ashley, 41.
- Virginia, Tazewell County : Harnsberger, 749.
- Washington, southwestern : Culver, 428.
- West Virginia, Abram Creek-Stony River field : Ashley, 40.
- Fayette County : Hennen, 797.
- sulphur in coals : White, 2008.
- Webster County : Reger, 1528.
- Coal Measures. *See* Carboniferous.
- Cobalt : Drury, 522; Hess, 800, 805, 806.
- Idaho, Lemhi County : Hess, 803.
- Ontario : Drury, 522; Cobalt : Whitehead, 2010.
- Cobble abrasion : Wentworth, 1983.
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- Colorado.
- Areas described.*
- Cripple Creek district : Van Tuyl, 1908.
- Platoro-Summitville district : Patton, 1454.
- Twin Lakes district : Howell, 874.
- Economic geology.*
- Carnotite, Gateway district : Farnum, 573.
- southwestern Colorado : Burwell, 251.
- Coal, Mancos district : Collier, 386.
- Evergreen copper ores, Gilpin County : McLaughlin, 1184.
- Fluorspar deposits : Aurand, 48; Boulder County : Hibbs, 815.
- Gold, Platoro-Summitville district : Patton, 1454.
- Gold, silver, copper, lead, and zinc : Henderson, 790, 793.
- Gypsum : Stone, 1785.
- Manganese : Jones, 948; Mullenburg, 1355.
- Mineral deposits, western slope : Aurand, 49.
- Molybdenite, Climax : Haley, 731.

Colorado—Continued.*Historical geology—Continued.*

- Morrison formation, type section: Lee, 1067.
- Pawnee Creek beds: Loomis, 1123.
- Routt and Moffat counties, anticlines: Perini, 1461.
- Routt County: Crawford, 416.

Mineralogy.

- Anglesite, Gunnison County: Shannon, 1676.
- Pyrite, Bald Mountain: Whitlock, 2014.

Paleontology.

- Amphicoelias: Osborn, 1406.
- Camarasaurus: Osborn, 1406, 1407.
- Cretaceous, northeastern Colorado: Henderson, 794.
- Culex winchesteri, Cathedral Bluffs: Cockerell, 367.
- Dinosauria: McKelvey, 1180.
- Entelodonts: Troxell, 1865.
- Eocene insects: Cockerell, 369.
- Florissant, parasitic Hymenoptera: Cockerell, 368.
- Morrison flora: Knowlton, 1029.
- Ticholeptus rusticus: Loomis, 1124.

Petrology.

- Twin Lakes district: Howell, 874.

Physical geology.

- Building of Rockies: Chamberlin, 812.
- Erosion, Mesa Verde: Haas, 727.
- Montezuma County, McElmo anticline: Coffin, 375.
- Routt and Moffat counties, anticlines: Perini, 1461.
- Routt County anticlines: Crawford, 416.

Physiographic geology.

- Mesa Verde: Haas, 727.
- Rocky Mountains: Chamberlin, 312.

Underground water.

- Mineral waters: George, 643.
- San Luis Valley, hydrology: Headden, 776.

Columnar structure in lavas: James, 897.

Comanchean formation underlying Florida: Sellards, 1640.

Commercial control of mineral resources: Spurr, 1740.

Concretions.

- Missouri, Boone County, origin: Tarr, 1821.

Conglomerate.

- Cobalt conglomerate, origin: Coleman, 382.
- Edgewise conglomerate: Clarke, 352.
- Pennsylvania, Nittany Valley, conglomeratic limestone: Eaton, 534.

Connecticut.

- Middletown region: Cleland, 363.
- Report of survey: Conn. G. S., 397; Gregory, 704.

Historical geology.

- Meriden area: Waring, 1951.
- Norwalk, Suffield, and Glastonbury areas: Palmer, 1434.
- Quaternary, New Haven region: Ward, 1948.

Mineralogy.

- Chatham: Shannon, 1671.
- Datolite, Meriden: Shannon, 1676.
- Meriden: Shannon, 1666.
- Portland, Strickland's quarry: Shannon, 1670.
- Rhodonite, Portland: Foye, 621.
- Triplite, Chatham: Shannon, 1676.
- Trumbull, Long Hill: Shannon, 1677.

Physiographic geology.

- Danbury region, drainage modifications and glaciation: Harvey, 762.
- Postglacial uplift: Fairchild, 562.
- Quaternary, New Haven region: Ward, 1948.
- Terraces: Barrell, 74.

Underground water.

- Meriden area: Waring, 1951.
- Norwalk, Suffield, and Glastonbury areas: Palmer, 1434.

Cooper limestone, central Missouri: Greger, 698.

Copper: Bengzon, 119; Butler, 256, 257.

Alaska: Martin, 1220.

Chichagof Island, western part: Overbeck, 1411.

Jack Bay district: Johnson, 930.

Kennecott: Bateman, 98, 99; Anon., 2105.

Prince of Wales Island, Salt Chuck mine: Mertie, 1284.

Prince William Sound: Johnson, 929.

Arctic Canada: O'Neill, 1392.

Arizona: Crampton, 414; Helkes, 784, 786; Tovote, 1855.

Jerome district: Mitchell, 1325; Reber, 1522.

Ray-Miami region: Ransome, 1507.

Warren district: Mitchell, 1322, 1323.

British Columbia, Copper Mountain: Camsell, 284.

Hidden Creek mine: Campbell, 280.

Vancouver Island, Barkley Sound: Dolmage, 506; Sunloch district: Dolmage, 507.

California: Yale, 2093, 2095.

Canada, Arctic regions: O'Neill, 1392.

Central States: Dunlop, 527.

Colorado: Helkes, 790; Henderson, 793.

Cuba, Pinar del Rio: Corral, 409.

Eastern States: Dunlop, 529; Hill, 822.

Idaho: Gerry, 644, 646.

Adams County, I. X. L. prospect: Bell, 116.

Seven Devils district: Livingston, 1111.

Manitoba, northern: Bruce, 211; Hanson, 744; Wallace, 1940.

Mexico, Nacozari district, Sonora, Pilares mine: Wade, 1923.

Sonora: Tovote, 1855.

Michigan: Guck, 720; Lang, 1055; Woods, 2077.

Lake Superior region: Lang, 1056; Spurr, 1751; Winchell, 2058.

Montana: Gerry, 645; Helkes, 783.

Native copper, Nonsuch formation, Michigan: Nishio, 1375.

Nevada: Helkes, 782, 785.

New Mexico: Henderson, 789, 792; Tovote, 1855.

Mogollon district: Scott, 1641.

Santa Fe County: Berryman, 147.

Ontario, Sudbury: Bell, 113.

Oregon: Yale, 2093, 2095.

Quebec, Eastman, Huntingdon deposit: Hore, 858.

Richardton meteorite: Quirke, 1504.

South Dakota: Henderson, 788, 791.

Texas: Henderson, 789, 792.

Utah: Butler, 255; Helkes, 781, 787.

Tintic district: Lindgren, 1105.

Washington, Gerry, 644, 646.

Chewelah district: Armstrong, 37.

Stevens County: Weaver, 1970.

Wyoming: Henderson, 788, 791.

Coquihalla area, British Columbia: Camsell, 286.

Coquina, Florida: Brodie, 199.

Coral island and reefs: Vaughan, 1909.

Formation: Vaughan, 1911.

Origin: Davis, 472; Vaughan, 1909.

Coral reefs and the glacial period: Daly, 453.

Corals. *See* Anthoza.

Correlation.

Carboniferous, Kansas and Oklahoma: Goldman, 667.

Canadian Rockies: Burwash, 249.

Coal measures, Maryland: Swartz, 1804.

Coastal Plain area: Brantley, 191.

Cretaceous: Berry, 145.

Great Plains region: Twenhofel, 1871.

Gulf region: Berry, 129.

Upper: Stanton, 1755.

Devonian: Grabau, 685.

western Tennessee: Dunbar, 525.

Eocene: Berry, 136.

Correlation—Continued.

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 Interior coal fields: Keyes, 983.
 Michigan, Huronian formations: Allen, 25; Lane, 1053.
 Ordovician: Foerste, 603.
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 Porto Rico, Tertiary formations: Maury, 1248, 1250.
 Pre-Cambrian, northern Ontario and Quebec: Cooke, 407.
 northern Quebec: Cooke, 403.
 Silurian: Williams, 2034.
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 Bighorn Basin: Hewett, 811.
 southeastern United States: Vaughan, 1907.
 Texas, Bend formation: Girty, 659.
 Comanchean: Adkins, 6.
 Hudspeth County, Carboniferous: Beede, 111.
 Utah: Dake, 443.
 Wyoming, Rock Springs area, Sweetwater County: Schultz, 1639.

Costa Rica.*Economic geology.*

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Historical geology.

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 Guanacaste: Sears, 1642.

Physical geology.

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Cretaceous. See also Paleontology, Cretaceous.

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 Alaska, Anvik-Andreafski region: Harrington, 751.
 Kiwalik-Koyuk region: Harrington, 755.
 Alberta, Brule Lake region: MacVicar, 1196.
 Crownsnest coal field, northern part: Rose, 1575.
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 Peace and Athabaska valleys: McLearn, 1188.
 southern and central: Slipper, 1712.
 southwestern: Stewart, 1766.
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 western: Purdy, 1501.
 Arkansas: Miser, 1319.
 British Columbia, Coquihalla area: Camsell, 286.
 Lillooet-Prince George region: Reinecke, 1538.
 northeastern: Stewart, 1767.
 Vancouver Island, Barkley Sound: Dolmage, 506.
 California, San Diego County: Ellis, 542.
 Santa Barbara County, Santa Ynez River district: Kew, 980.
 Simi Valley: Kew, 979.
 Colorado, Mancos district: Collier, 386.
 Morrison formation: Lee, 1067.
 north central, foothills formations: Henderson, 795.
 northeastern: Henderson, 794.
 Routt and Moffatt counties: Perini, 1461.
 Routt County: Crawford, 416.
 southwestern: Forrester, 610.
 Twin Lakes district: Howell, 874.
 Correlation: Berry, 145.
 Great Plains region: Twenhofel, 1871.
 Gulf region: Berry, 129.
 Upper Cretaceous: Stanton, 1755.
 Delaware, Wilmington quadrangle: Bascom, 86.
 Florida, Comanchean (underlying): Sellards, 1648, 1649.
 underlying limestones: Cushman, 431, 433.
 Georgia: McCallie, 1159.
 Greenland: Bøggild, 157.
 Gulf region: Berry, 129.

Cretaceous—Continued.

- Gulf Coastal Plain: Shaw, 1683.
 Iowa, Adair County: Gow, 679.
 Cass County: Tilton, 1847.
 southwestern: Smith, 1714.
 Kansas: Moore, 1346; Snider, 1736; Twenhofel, 1872.
 Comanchean and Dakota strata: Twenhofel, 1871.
 Syracuse and Lakin quadrangles: Darton, 462.
 Kentucky: Miller, 1293.
 Louisiana, Sabine uplift: Powers, 1483.
 Mackenzie River basin: Camsell, 281.
 Maryland, Elkton quadrangle: Bascom, 86.
 Federal Hill: Berry, 141.
 Mexico, Guerrero, Zumpango: Burckhardt, 240.
 Minnesota: Grout, 715.
 Mississippi: Lowe, 1138, 1140.
 Montana, central: Bowen, 171.
 Fergus County: Freeman, 622.
 Huntley Field: Hancock, 734.
 New Jersey, glauconite beds: Mansfield, 1210.
 New Mexico: Keyes, 998; Knox, 1031.
 Alamosa Creek valley: Winchester, 2061.
 eastern: Baker, 55.
 northeastern: Garrett, 649.
 Pecos Valley: Semmes, 1658.
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 North Dakota: Leonard, 1082, 1084.
 western: Stanton, 1756.
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 western: Harrison and Eaton, 761.
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 San Juan district: Semmes, 1656.
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 western: Stanton, 1756.
 Tennessee, Upper Cretaceous: Wade, 1922.
 western: Schroeder, 1623.
 Texas: Böse, 162; Udden, 1880.
 Bexar County: Sellards, 1650, 1653.
 Butler salt dome: Powers, 1484.
 central: Matteson, 1231.
 Crockett County: Liddle, 1102.
 Dallas County: Shuler, 1696.
 Diablo Plateau: Beede, 110.
 eastern: Dumble, 524.
 Fredericksburg and Washita formations: Adkins, 7.
 Tarrant County: Winton, 2062.
 Terrell County: Christner, 339.
 Weno and Pawpaw formations: Adkins, 6.
 Upper Cretaceous Mississippi gulf: Berry, 135.
 Utah: Butler, 255.
 Carbon County, Farnham anticline: Clark, 844.
 eastern: Forrester, 610.
 Wyoming, Cody region: Hewett, 811.
 Fremont County, Big Sand Draw: Collier, 388.
 Lance Creek field: Hancock, 737.
 Maverick Springs: Collier, 389.
 Mule Creek oil field: Hancock, 736.
 Rock Springs area, Sweetwater County: Schultz, 1689.
 Upton-Thornton oil field: Hancock, 735.
- Crinoidea. *See also* Echinodermata.
 Carboniferous crinoids, parasitism: Moodie, 1885.
 Flexibilia: Springer, 1748.
 Herpetocrinus, Monticello, Iowa: Thomas, 1834.
 Mysticocrinus: Bather, 101.

Crustacea.

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 Dominican Republic, Tertiary decapods : Rathbun, 1513.
 West Indies, Tertiary decapod : Rathbun, 1512.

Cryolite : Burchard, 232.**Cryptogams.** *See* Paleobotany.**Cryptozoon** : Rothpletz, 1582.**Crystallography.**

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 Axinite, British Columbia : Poltevin, 1479.
 Barite : Whitlock, 2012.
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 calculations in isometric system : Palache, 1420.
 calculations in orthorhombic system : Palache, 1424.
 calculations in tetragonal system : Palache, 1421.
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Cuba. *See also* West Indies.**Economic geology.**

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 Chrome ore : Burch, 228, 229 ; Burchard, 235, 239.
 Chromite, San Miguel de los Baños, Matanzas : Suárez Murias, 1799.
 Copper, Pinar del Río : Corral, 409.
 Iron : Weld, 1972 ; Santiago : Kimball, 1001.
 Isle of Pines : Suárez Murias, 1797.
 Manganese : Burch, 228, 229 ; Burchard, 237, 238.
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 Potash, Santa Clara : Montolieu, 1830.

Historical geology.

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 Oxfordian, western Cuba : Brown, 203.
 Pinar del Río, Bahía Honda y La Palma : Suárez Murias, 1798.

Paleontology.

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 Tertiary Mollusca : Cooke, 398.

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 Caryocrinites, appearance of additional arms : Foerste, 607.
 Holocystites : Foerste, 606.
 Stromatocystites, Newfoundland : Schuchert, 1627.

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Dakota flora, age : Berry, 145.

Data of geochemistry : Clarke, 348.

Decomposition of rocks. *See* Weathering.

Definitions.

Fossil : Field, 592 ; Miller, 1299.

Talus and shingle : La Forge, 1042.

Delaware.

Areas described.

Wilmington quadrangle : Bascom, 86.

Denudation. *See* Erosion.

Deposition. *See* Sedimentation.

Deposition of ores. *See* Ore deposits, origin.

Deserts.

Mexico, San Luis Potosi, desert phenomena : Wittich, 2064.

Devonian. *See also* Paleontology, Devonian.

Acadia Bailey, 53.

Alberta : Dowling, 517.

Arctic regions, Ellesmere Land : Høltedahl, 850.

Arizona, Ray-Miami region : Ransome, 1507.

Arkansas : Miser, 1819.

Georgia : McCallie, 1159.

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northwestern : Koch, 1033.

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southwestern : Savage, 1605.

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Hackberry stage : Fenton, 580.

Independence shale, Brandon, Iowa : Thomas, 1835.

Kentucky : Miller, 1293.

Allen County : Miller, 1297 ; Shaw, 1680.

Barren County : Butts, 259.

MacKenzie River basin : Cammell, 281.

Minnesota : Grout, 715.

Mississippi : Lowe, 1138.

Missouri : Branson, 190.

central : Greger, 697.

Cooper limestone : Greger, 698.

New Brunswick : Bailey, 52.

New Mexico : Keyes, 993.

eastern : Baker, 55.

New York, Catskill region : Jones, 951.

Portage stratigraphy : Chadwick, 308.

Sherburne sandstone : Grabau, 685.

western : Hussakof, 884.

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Mattagami and Abitibi rivers : Williams, 2041.

Oregon : Smith, 1727, 1728.

Quebec, Gaspé County, Lemieux : Mailhot, 1199.

Tennessee, Overton County : Butts, 258.

Sumner County : Mather, 1227.

Utah : Butler, 255.

Tintic district : Lindgren, 1105.

Virginia, Oriskany and Helderberg formations : Holden, 845.

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Diamonds : Ball, 61.

Diatomaceae.

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Diceratheres: Peterson, 1468.**Diffusion in vein genesis at Cobalt:** Whitman, 2020.**Dikes.**

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Dinosauria. *See* Reptilia.**Dip** components, determination: Lahee, 1043; Palmer, 1432.**Discoidal structure of the lithosphere:** Willis, 2045, 2049.**Dislocation.** *See* Faulting.**Distribution of land and water on the earth:** Reid, 1534.**District of Columbia.***Mineralogy.*

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Drift deposits. *See* Glacial geology: Ice ages (ancient).**Drumlins.**

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- General: Daly, 456; Willis, 2049.
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Earth—Continued.

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recent, Palmer, 1430.

registration: Bond, 165; Davis, 468-471.

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Eruptive rocks. See Igneous and volcanic rocks.**Eskers.**

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Evolution.

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Excursions.

Explorations.

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 Iowa, Cass County : Tilton, 1847.
 southwestern, Thurman-Wilson fault : Tilton, 1845.
 Kansas, eastern : Fath, 575.
 Montana, belt of oblique faulting : Chamberlin, 318.
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 Thrust faulting, process : Quirk, 1505, 1506.
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 Utah : Butler, 255.
 Sevier Valley : Young, 2100.
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Feldspar : Beach, 105.

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Fissures. *See* Faulting.

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Paleontology.

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 Human remains, Vero : Hrdlička, 875 ; Sellards, 1645 ; Sterna, 1763.
 Mammalian and fish remains : Hay, 764.
 Miocene Foraminifera : Cushman, 436.

Physical geology.

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Fluorspar : Burchard, 232.

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 Illinois, Hardin County : Weller, 1973.

Fluorspar—Continued.

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Folding.

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- Experimental investigation : Mead, 1252.
- Kansas, eastern : Fath, 575.
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Foliation.

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Footprints.

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Formations. See Geologic formations.**Fort Dodge gypsum, Iowa : Lees, 1072.****Fossil, use of term : Field, 592 ; Miller, 1299.****Fossilization.**

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Fossils. See Paleontology.**Framework of the earth : Davis, 473, 474.****Franklin.***Mineralogy.*

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Gas. See Natural gas.**Gastropoda. See also Mollusca.**

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Gems : Schaller, 1609.**Genesis of ores. See Ore deposits, origin.****Geochemistry.**

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Geologic climate. See Paleoclimatology.**Geologic formations, tables. For geologic formations described see list p. 244.**

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- Alberta, lower Smoky River : McLearn, 1187.
- southwestern : Stewart, 1766.
- Arizona, northwestern : Shimer, 1693.
- Arkansas, Batesville district : Miser, 1320.
- British Columbia, Ainsworth district : Schofield, 1619.
- Lillooet-Prince George region : Reinecke, 1538.
- northeastern : Stewart, 1767.

Geologic formations, tables—Continued.

British Columbia—Continued.

Rocky Mountains: Schofield, 1621.

Slocan area: Bancroft, 66.

Vancouver Island, Barkley Sound: Dolmage, 506.

California, San Diego County: Ellis, 542.

Simi Valley: Kew, 979.

Canada, Mackenzie River basin: Camsell, 281.

Colorado, north central, foothills formations: Henderson, 795.

Cretaceous, Upper: Stanton, 1755.

Devonian: Savage, 1604; western Tennessee: Dunbar, 526.

Dominican Republic: Cooke, 400.

Florida: Sellards, 1647, 1648.

Georgia: McCallie, 1140.

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Mesozoic and Cenozoic: Knowlton, 1027.

Missouri: Dake, 441.

Montana, central: Bowen, 171.

New Brunswick: Bailey, 52.

New Jersey, Cretaceous and Eocene: Mansfield, 1209.

New Mexico: Keyes, 993.

Alamosa Creek valley: Winchester, 2061.

North Dakota: Leonard, 1082; western: Stanton, 1756.

Ohio, Muskingum County: Stout, 1794.

Oregon: Smith, 1728; western: Harrison and Eaton, 761.

Pacific region, Mesozoic and Cenozoic: Kew, 981.

Panama: Vaughan, 1910.

Tertiary: Vaughan, 1907.

Tertiary marine: Cushman, 435.

Porto Rico, Tertiary formations: Maury, 1248.

Pre-Cambrian, Michigan: Allen, 25.

Quebec, Coleraine area: Knox, 1030.

Harricana-Turgeon basin: Tanton, 1813.

Silurian, southwestern Ontario: Williams, 2034.

Southeastern United States: Vaughan, 1910.

South Dakota, Black Hills region: O'Hara, 1389.

western: Stanton, 1756.

Tennessee, western valley: Dunbar, 525.

Tertiary: Canu, 290; Peterson, 1468; southeastern United States: Vaughan, 1907.

Texas, Bexar County: Sellards, 1653.

Comanchean: Adkins, 6.

Cretaceous: Böse, 162.

Crockett County: Liddle, 1102.

Utah: Dake, 443.

Tintic district: Lindgren, 1105.

Wyoming: Morgan, 1352.

Lance Creek field: Hancock, 737.

Mule Creek oil field: Hancock, 736.

Rock Springs area, Sweetwater County: Schults, 1639.

Thermopolls district: Collier, 887.

Upton-Thornton oil field: Hancock, 735.

Geologic history.

Adirondacks: Alling, 26.

Alabama, Coastal Plain: Brantley, 191.

Alaska, Anvik-Andreafski region: Harrington, 751.

Kantishna region: Capps, 291.

Alberta, southern and central: Slipper, 1712.

southwestern: Stewart, 1766.

Geologic history—Continued.

- Arizona, Bright Angel quadrangle: Noble, 1876.
 Jerome district, Yavapai County: Reber, 1522.
 Bay-Miami region: Ransome, 1507.
 San Carlos Indian Reservation: Schwennesen, 1640.
 British Columbia, Ainsworth district: Schofield, 1619.
 Purcell trench: Schofield, 1621.
 California, San Diego County: Ellis, 542.
 Canadian Rockies: Burwash, 249, 250.
 Caribbean region: Vaughan, 1910.
 Central America: Vaughan, 1907, 1910.
 Colorado, north central, foothills formations: Henderson, 796.
 Twin Lakes district: Howell, 874.
 Crustal deformation: Schuchert, 1637.
 Delaware, Wilmington quadrangle: Bascom, 86.
 Florida: Cushman, 433.
 Georgia, Cartersville district: Hull, 878.
 Greenland: Bøggild, 157.
 Idaho, Fort Hall Indian Reservation: Mansfield, 1211.
 Illinois: Cady, 270.
 Colchester and Macomb quadrangles: Hinds, 832.
 Hennepin quadrangle: Cady, 267.
 La Salle quadrangle: Cady, 267.
 Indiana, Greene County, eastern: Malott, 1205.
 Kansas, Syracuse and Lakin quadrangles: Darton, 462.
 western: Twenhofel, 1871.
 Lake Erie region: Decker, 483.
 Louisiana, Sabine uplift: Powers, 1483.
 Manitoba, northern: Bruce, 211.
 Maryland, Elkton quadrangle: Bascom, 86.
 Mesozoic, southern North America: Stanton, 1754.
 Mesozoic floras of North and South America: Knowlton, 1026.
 Mexico: Lewis, 1100.
 Michigan, pre-Cambrian: Allen, 25.
 Mid-Continent oil fields: Bosworth, 169.
 Minnesota: Grout, 715.
 Herman, Barrett, Chokio, and Morris quadrangles: Sardeson, 1600.
 Mississippi Valley, upper, late Paleozoic: Van Tuyl, 1901.
 Montana, central, Upper Cretaceous: Bowen, 171.
 Fergus County: Freeman, 622.
 New Mexico, Taos Range: Gruner, 720.
 New York, Adirondacks: Miller, 1810.
 Canton quadrangle: Chadwick, 310.
 Genesee River region: Fairchild, 561.
 Lake Clear region: Alling, 26.
 Lake Placid quadrangle: Miller, 1803.
 Pleistocene: Fairchild, 564.
 Schroon Lake quadrangle: Miller, 1804.
 Oregon: Smith, 1728.
 Pleistocene: McCornack, 1165.
 western: Harrison and Eaton, 761.
 Oriskany formation: Fettke, 588.
 Paleozoic, Atlantic-Artic region: Hortedahl, 851.
 Porto Rico: Berkey, 124.
 Coamo-Guayama district: Hodge, 837.
 Pottsville formation: Fettke, 588.
 Quebec, Coleraine area: Knox, 1030.
 northern: Cooke, 403.
 Rocky Mountains: Keyes, 995.
 South Dakota, Black Hills region: O'Harra, 1889.
 Newell quadrangle: Darton, 461.
 Tennessee, Rutherford County: Galloway, 633.
 western valley: Dunbar, 525.
 Texas, central: Matteson, 1231.
 Dallas County: Shuler, 1696.
 eastern: Dumble, 524.

Geologic history—Continued.

Upper Cretaceous Mississippi Gulf: Berry, 185.

Utah: Schneider, 1618.

Tintic district: Lindgren, 1105.

Vermont, Barre: Perkins, 1466.

central: Richardson, 1544.

Northfield: Richardson, 1545.

Pleistocene history: Fairchild, 557.

Virgin Islands: Vaughan, 1915.

Washington: Weaver, 1969.

Stevens County: Weaver, 1970.

West Indies: Matthew, 1239; Vaughan, 1907.

Geologic maps.

Alabama: Smith, 1718; (part): Brantley, 191.

northern: Semmes, 1657.

Alaska, Anvik-Andreafski region: Harrington, 751.

Canyon Creek: Overbeck, 1412.

Chichagof Island, western part: Overbeck, 1211.

Chulitna region, upper: Capps, 294.

Jack Bay district: Johnson, 930.

Kahlitna Valley: Mertie, 1282.

Kennecott: Bateman, 98.

Kiwalik-Koyuk region: Harrington, 755.

Marshall mining district: Harrington, 751.

Nenana field: Martin, 1217.

Nenana-Kantishna region: Capps, 291.

Porcupine district: Eakin, 530.

southeastern: Burchard, 236.

Talkeetna Mountains, western: Capps, 293.

Tolstoi district: Harrington, 752.

Alberta, Ribstone Valley: Dowling, 517.

southern: Stewart, 1766.

Arctic regions, Ellesmere Land: Hottedahl, 850.

Arizona, Bisbee district: Jones, 946.

Cave Creek district: Lewis, 1095.

Globe-Ray region: Ransome, 1507.

Jerome district, Yavapai County: Reber, 1522.

Miami district: Ransome, 1507.

Ray district: Ransome, 1507.

San Carlos Indian Reservation: Schwennesen, 1640.

Tombstone district: Jones, 946.

Tucson and Amole Mountains: Jenkins, 901.

Arkansas: Ferguson, 582.

Batesville district: Miser, 1320.

Black Hills region: O'Harra, 1389.

British Columbia: Schofield, 1618.

Ainsworth district: Schofield, 1619.

Copper Mountain: Camsell, 284.

Hazleton: O'Neill, 1390.

Purcell trench: Schofield, 1621.

Vancouver Island, East Sooke Peninsula: Cooke, 402.

Vancouver Island, Sunloch district: Dolmage, 507.

California, Del Norte County: Logan, 1115.

San Diego County: Ellis, 542.

San Jacinto and Temecula basins: Waring, 1950.

Santa Barbara County, Santa Ynez River district: Kew, 980.

Santa Clara Valley: Reinhard, 1539.

Simi Valley: Kew, 979.

Siskiyou County, Salmon River district: Logan, 1115.

Sunset-Midway field: Pack, 1415.

Canada, Mackenzie River basin: Camsell, 281.

platinum occurrences: O'Neill, 1391.

Coal fields: U. S. Geol. Survey, 1894.

Colorado, Mancos district: Collier, 386.

Montezuma County, McElmo anticline: Coffin, 875.

north central, foothills formations: Henderson, 795.

Platoro-Summitville district: Patton, 1454.

geologic maps—Continued.

Colorado—Continued.

- Routt and Moffat counties: Perini, 1461.
- Routt County: Crawford, 416.
- Twin Lakes district: Howell, 924.
- Connecticut, Glastonbury area: Palmer, 1434.
- Meriden area: Waring, 1951.
- Norwalk area: Palmer, 1434.
- Suffield area: Palmer, 1434.
- Cretaceous deposits, eastern Gulf region: Berry, 129.
- Delaware, Wilmington quadrangle: Bascom, 86.
- Florida: Sellards, 1647, 1648.
- Georgia: McCallie, 1159.
- Cartersville district: Hull, 878, 880.
- Greenland: Boggild, 157.
- Gulf Coastal Plain: Urbina, 1898.
- Idaho: Bell, 118.

- eastern: Mansfield, 1216.
- Fort Hall Indian Reservation: Mansfield, 1111.
- Pine Creek district: Jones, 944.
- Seven Devils district: Livingston, 1111.
- south central: Umpleby, 1893.
- Wardner district: Rickard, 1551.
- Yellow Pine district: Larsen, 1059.
- Illinois, Colchester and Macomb quadrangles: Hinds, 832.
- Hardin County and Pope County (part): Weller, 1978.
- Hennepin quadrangle: Cady, 267.
- Hennepin and La Salle quadrangles, surficial geology: Cady, 267.
- La Salle quadrangle: Cady, 267.
- mineral industries: Christensen, 338.
- northeastern: Anderson, 30.
- Saline and Gallatin counties: Cady, 268.

Indiana: Logan, 1120.

- Greene County: Logan, 1119; eastern: Malott, 1205.
- Lawrence County: Logan, 1119.
- Martin County: Logan, 1119.
- Monroe County: Logan, 1119.
- Orange County: Logan, 1119.
- Owen County: Logan, 1119.

Iowa, Adair County: Gow, 679.

- Cass County: Tilton, 1847.
- Clarke County: Tilton, 1846.
- drift sheets: Kay, 963.
- eastern: Norton, 1381.
- north central: Fenton, 580.
- Ringgold County, surface deposits: Arey, 35.
- Taylor County, surface deposits: Arey, 36.
- Kansas, Allen and Neosho counties: Moore, 1347.
- oil and gas fields: U. S. Geol. Survey, 1895.
- Quaternary deposits: Moore, 1346.
- Syracuse and Lakin quadrangles: Darton, 462.
- Wilson and Montgomery counties: Moore, 1348.

Kansas and Oklahoma: Snider, 1736.

Kansas and the adjoining region: Moore, 1346.

Kentucky: Jillson, 920.

- Allen County: Miller, 1297; Shaw, 1680.
- Barren County: Butts, 259.
- Breathitt County: Jillson, 914.
- Knott County: Jillson, 914.
- Tennessee and Virginia (parts): Shaw, 1680.
- Warren County: Shaw, 1680.

Kentucky and adjacent regions: Jillson, 903.

Mackenzie River basin: Cammell, 281.

Manitoba, Reed, and Wekusko lakes region: Alcock, 10.

178 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1919-1920.

Geologic maps—Continued.

- Mexico: Iglesias, 888; Lewis, 1100.
- Hidalgo, Apan district: Camacho, 275.
- Zacualpan district: Lewis, 1100.
- Michigan, Lower Peninsula: Phalen, 1469.
- Marquette and Menominee districts: Winchell, 2058.
- Mid-Continent oil fields: Bosworth, 169.
- Minnesota: Sardeson, 1600.
- clay materials: Grout, 715.
- eastern Mesabi range: Grout, 716.
- Herman, Barrett, Chokio, and Morris quadrangles: Sardeson, 1600.
- surface formations: Leverett, 1092.
- Mississippi: Lowe, 1138, 1139.
- Montana, Huntley field: Hancock, 734.
- Jordan coal field: Bowen, 171.
- Stanford hematite district: Westgate, 1985.
- Nevada, Pleistocene Lake beds: Clark, 347.
- New Brunswick, Burnthill Brook area: Young, 2097.
- New Mexico, Alamosa Creek valley: Winchester, 2061.
- Puertecito district: Wells, 1978.
- Taos Range: Gruner, 720.
- New York, Canton quadrangle: Chadwick, 310.
- Catskill region: Jones, 951.
- Coboes quadrangle, glacial: Stoller, 1774.
- eastern, Pleistocene: Fairchild, 556.
- Lake Bonaparte-Lowville quadrangles: Buddington, 225.
- Lake Placid quadrangle: Miller, 1303.
- Rochester district, Pleistocene: Fairchild, 561.
- St. Regis and Saranac quadrangles (parts): Alling, 26.
- St. Regis and Saranac quadrangles (parts), glaciation: Alling, 26.
- Schroon Lake quadrangle: Miller, 1304.
- North America: Pirsson, 1474.
- North Dakota: Leonard, 1082.
- western: Stanton, 1756.
- Nova Scotia, Malagash Peninsula, Cumberland County: Hayes, 772.
- Ohio: Bownocker, 182.
- Dunkard series: Stauffer, 1757.
- Oklahoma, Osage Reservation: Goldman, 667; Heald, 777-780; Hopkins, 854; Ross, 1578.
- Ontario, Argonaut gold mine: Knight, 1020.
- Ben Nevis area: Knight, 1019.
- glacial shore lines: Ledoux, 1063.
- Gowanda area: Burrows, 245.
- Kirkland Lake area: Burrows, 246.
- Matachewan district: Cooke, 401.
- Niagara Peninsula: Williams, 2034.
- Nipissing district, Cedar and Net lakes: Knight, 1018.
- Ontario Peninsula: Williams, 2034.
- phosphate area: Spence, 1745.
- Renfrew County (part): Wilson, 2053.
- southwestern: Williams, 2035.
- Sudbury district, Windy Lake nickel area: Knight, 1018.
- Thunder Bay district: Tanton, 1815.
- Timiskaming: Cross, 422; Hume, 881.

Geologic maps—Continued.

- South Dakota, Black Hills region: O'Harra, 1389.
 Newell quadrangle: Darton, 461.
 western: Stanton, 1756.
 Tennessee: Jenkins, 899.
 Overton County (part), structure: Butts, 258
 Rutherford County: Galloway, 638.
 Upper Cretaceous: Wade, 1922.
 western valley: Dunbar, 525.
 Texas: Currier & Company, 429; Snider, 1736.
 Bexar County: Sellards, 1653.
 central east: Dumble, 524.
 Crockett County: Liddle, 1102.
 Dallas County: Shuler, 1696.
 Diablo Plateau: Beede, 110.
 Eastland and Stephens counties, structural conditions: Adams, 1.
 north central: Hager, 730.
 Pecos Valley: Liddle, 1102.
 Petrolia field: Shaw, 1686.
 Tarrant County: Winton, 2062.
 Terrell County: Christner, 389.
 United States, peat deposits: Osborn, 1400.
 Utah: Butler, 255.
 Carbon County, Farnham anticline: Clark, 344.
 Tintic district: Lindgren, 1105.
 Tintic quadrangle: Lindgren, 1105.
 Vermont, Cuttingsville: Eggleston, 538.
 Northfield: Richardson, 1545.
 Roxbury: Richardson, 1546.
 Virginia, Blue Ridge, west foot: Stose, 1786.
 Tazewell County: Harnsberger, 749.
 Washington, southwestern: Culver, 428.
 Stevens County: Weaver, 1970.
 West Virginia, Abram Creek-Stony River field: Ashley, 40.
 Fayette County: Hennen, 797.
 Webster County: Reger, 1528.
 Wyoming: Morgan, 1352.
 Cody region: Hewett, 811.
 Lance Creek field: Hancock, 737.
 Mule Creek oil field: Hancock, 736.
 Rock Springs area, Sweetwater County: Schultz, 1689.
 Upton-Thornton oil field: Hancock, 735.

Geologic time.

- Laminated deposits: De Geer, 484.
 Pleistocene clays as a chronometer: Fairchild, 567.
 Postglacial time, measurement: Gleason, 662.

Geological surveys. See Surveys.**Geologists as expert witnesses: Ransome, 1511.****Geologists as witnesses in mining litigation: Leith, 1081.****Geology in the law: Kemp, 973.****Geology in the world war and after: Cross, 423.****Geology in war: DeWolf, 494.****Geomorphogeny. See Physiographic geology.****Geomorphology. See Physiographic geology.****Geomorphy. See Earth, figure.****Geophysics.**

- Problems: Sosman, 1742.

Georgia.**Economic geology.**

- Barytes deposits: Hull, 930.
 Gold, McDuffie County: Bruhl, 212.
 Manganese: Hull, 928; Stose, 1792.
 Ocher deposits, Cartersville: Haney, 740.
 Oil prospect near Scotland, Telfair County: Hull, 879.
 Potash slates, Cartersville: Maynard, 1251.

Historical geology.

- Cartersville district: Hull, 928, 930.
 Cretaceous: Berry, 129.

Georgia--Continued.

Historical geology Continued.

General: McCallie, 1159.

Telfair County: Hull, 879.

Paleontology.

Cretaceous floras: Berry, 129.

Geotectonic adaptation through retardation of the earth's rotation: Keyes, 987.

Geothermal data of United States: Darton, 464.

Geothermal gradient, Sunset-Midway oil field, California: Rogers, 1566.

Gilsonite.

Utah: Bawdwell, 68.

Glacial geology. *See also* Quaternary.

Alaska, northern, Canning River region: Leffingwell, 1074.

British Columbia: Tyrrell, 1875.

Cariboo district: Tyrrell, 1876.

Colorado, Twin Lakes district: Howell, 874.

Connecticut, Danbury region: Harvey, 762.

New Haven region: Ward, 1948.

Coral reefs and the glacial period: Daly, 453.

Glacial epoch, cause: Wright, 2088.

Gumbotil, origin: Kay, 963.

Ice age in North America: Wright, 2088.

Illinois, Chicago area: Salisbury, 1594.

Hennepin quadrangle: Cady, 267.

La Salle quadrangle: Cady, 267.

Pleistocene: Leighton, 1077.

Indiana, northwestern: Barrett, 76.

Iowa, Adair County: Gow, 679.

Camp Dodge region: Lees, 1069.

Cass County: Tilton, 1847.

Clarke County: Tilton, 1846.

Des Moines: Keyes, 996.

Louisa and Washington counties: Schoewe, 1615.

Ringgold County: Arey, 35.

Taylor County: Arey, 36.

Union County, Aftonian gravels: Kay, 964.

Wisconsin and Iowan drifts: Cable, 262.

Iowan-Wisconsin border, Iowa: Cable, 263.

Juan de Fuca lobe of Cordilleran ice sheet: Bretz, 193.

Labrador ice sheet, extent and thickness: Coleman, 380.

Lake Chicago basin: Baker, 56.

Maine, Mount Desert Island: Bascom, 87.

Manitoba, Knee Lake district: Bruce, 210.

Michigan, Kalamazoo area: Leverett, 1093.

Minnesota: Grout, 715; Leverett, 1092.

Herman, Barrett, Chokio, and Morris quadrangles: Sardeson, 1600.

New England: Daly, 458.

southern: Fairchild, 562.

Newfoundland, southeastern: Buddington, 226.

New Hampshire: Goldthwait, 669.

New York, Canton quadrangle: Chadwick, 310.

Cohoes quadrangle: Stoller, 1774.

eastern: Fairchild, 556.

Genesee River region: Fairchild, 561.

Lake Clear region: Alling, 26.

Lake Placid quadrangle: Alling, 27.

northern: Fairchild, 566.

Pleistocene: Fairchild, 564.

Schroon Lake quadrangle: Miller, 1304.

North America: Wright, 2088.

North Dakota: Leonard, 1082.

Pleistocene deposits: Todd, 1840.

Ontario, Abitibi and Mattagami rivers: Keele, 966.

Oregon: Smith, 1728.

Pleistocene history: McCornack, 1165.

Pennsylvania: Williams, 2032.

Pleistocene clays as a chronometer: Fairchild, 567.

Glacial geology—Continued.

- Prince Edward Island: Coleman, 379.
- Quebec, Magdalen Islands: Coleman, 379.
- Saskatchewan, southeastern: Stansfield, 1752.
- Vermont, Northfield: Richardson, 1545.
- Roxbury: Richardson, 1546.
- Washington, Juan de Fuca: Glacier: Bretz, 193.
- Wyoming, Beartooth Plateau: Dake, 442.

Glacial Lakes. *See also* Beaches; Shore lines; Terraces.

- Indiana, northwestern: Barrett, 76.
- Lake Agassiz: Leonard, 1082.
- Lake Chicago: Baker, 56.
- Lake Dawson: Fairchild, 561.
- Lake Iroquois: Fairchild, 561.
- Michigan, Kalamazoo area: Leverett, 1093.
- New York, Cohoes quadrangle: Stoller, 1774.
- eastern: Fairchild, 556.
- Genesee River region: Fairchild, 561.
- Lake Clear region: Alling, 26.
- Lake Placid quadrangle: Alling, 27.
- Schroon Lake quadrangle: Miller, 1804.

Glacial period. *See* Glacial geology.**Glacial Lake section, Alberta: Walcott, 1928.****Glaciers.**

- Alaska: Chamberlin, 315.
- northern, Canning River region: Leffingwell, 1074.
- British Columbia, Yoho Glacier, movement, 1917-19: Wheeler, 1987.
- Canada, Rocky Mountains: Wheeler, 1986.
- Yukon, Klutian Glacier: Lambert, 1048.

Glades.

- Origin: Galloway, 683.

Glass sand: Richardson, 1547.

- Kentucky: Richardson, 1547.
- Pennsylvania: Fetteke, 588.
- Virginia: Watson, 1962.

Glaucinite: Goldman, 664.

- Missouri, southeastern: Ross, 1577.
- New Jersey: Mansfield, 1209, 1210, 1215.
- Origin: Mansfield, 1215; Tarr, 1819.

Glossary of mining and mineral industry: Fay, 576.**Gold: Dunlop, 528; McCaskey, 1162; Wuensch, 2090.**

- Alaska: Martin, 1220.
- Anvik-Andreafski region: Harrington, 751.
- Chichagof Island, western part: Overbeck, 1411.
- Chistochina region: Chapin, 330.
- Fairbanks district: Chapin, 331.
- Hot Springs district: Chapin, 333.
- Jack Bay district: Johnson, 930.
- Kahlitna Valley: Mertie, 1282.
- Kantishna region: Capps, 291.
- Kenai Peninsula: Johnson, 931.
- Kiwalik-Koyuk region: Harrington, 755.
- Kodiak Island: Maddren, 1198.
- Porcupine district: Eakin, 530.
- Prince William Sound: Johnson, 929.
- Seward Peninsula: Cathcart, 305.
- Tolovana district: Overbeck, 1413.
- Tolstoi district: Harrington, 752.
- Willow Creek district: Capps, 292; Chapin, 336.

Arizona: Helkes, 784, 786.**British Columbia: Camsell, 288.**

- Cariboo district: MacKay, 1177, 1178; Tyrrell, 1876.
- Coquihalla area: Camsell, 286.

California: Yale, 2093, 2095.

- Nevada County: Mac Boyle, 1156.
- Plumas County: Mac Boyle, 1157.
- Sierra County: Mac Boyle, 1158.

Gold—Continued.

- Colorado: Henderson, 790, 793.
 - Cripple Creek district: Van Tuyl, 1903.
 - Platoro-Summitville district: Patton, 1454.
 - Twin Lakes district: Howell, 874.
 - Eastern States: Dunlop, 529; Hill, 822.
 - Georgia, McDuffie County: Bruhl, 212.
 - Idaho: Gerry, 644, 646.
 - Boise Basin district: Ballard, 62.
 - Manitoba, Copper Lake district: Wallace, 1941.
 - southeastern: Bruce, 209.
 - Reed and Wekusko lakes region: Alcock, 10.
 - Mexico, San Luis Potosi, Guadalcázar: Wittich, 2069.
 - Montana: Gerry, 645; Helkes, 783.
 - Nevada: Helkes, 782, 785.
 - Divide district: Carpenter, 296; Sizer, 1710; Young, 2098.
 - New Mexico: Henderson, 789, 792.
 - Mogollon district: Scott, 1641.
 - Nicaragua, eastern: Garbrecht, 637.
 - Nova Scotia, southwestern: Faribault, 572.
 - Ontario, Argonaut gold mine: Knight, 1020.
 - Ben Nevis area: Knight, 1019.
 - Kirkland Lake area: Burrows, 246; Johnson, 984.
 - Larder Lake area: Hopkins, 905.
 - Lightning River area: Burrows, 243.
 - Matachewan district: Burrows, 244; Cooke, 401, 404, 405.
 - Michipicoten district: Collins, 390.
 - Montreal River district: Anon., 2106.
 - Porcupine field: Bell, 114; Dougherty, 511.
 - Sudbury district, Wasapika area: Hore, 857, 859, 860, 861.
 - Timiskaming district, Abitibi-Night Hawk gold area: Knight, 1015.
 - West Shining Tree district: Goodwin, 671; Hopkins, 856.
 - Oregon: Yale, 2093, 2095.
 - Josephine County, Waldo district: Kellogg, 909.
 - Quebec: Harricanaw River area: Mailhot, 1201.
 - Lake Demontigny region: Mailhot, 1202.
 - South Dakota: Henderson, 788, 791.
 - Southern States: Megraw, 1253.
 - Texas: Henderson, 789, 792.
 - Utah: Butler, 255; Helkes, 781, 787.
 - Tintic district: Lindgren, 1105.
 - Washington: Gerry, 644, 646.
 - Stevens County: Weaver, 1970.
 - Wyoming: Henderson, 788, 791.
 - Yukon, Mayo area: Cockfield, 370, 373.
- Gowganda silver area, Ontario: Burrows, 245.
- Grand Canyon. *See* Arizona.
- Granite.**
- Vermont, Barre: Perkins, 1466.
- Graphite: Dub, 523; Ferguson, 581; Spearman, 1743; Spence, 1744.
- Alabama: Brumell, 213; Prouty, 1499.
 - Alaska, Seward Peninsula: Harrington, 754.
 - Canada: Spence, 1744.
 - Mexico, Sonora: Paredes, 1447.
 - Ontario, Ottawa Valley: Wilson, 2053.
 - Renfrew district: Wilson, 2053.
 - Quebec: Brumell, 213.
 - Amherst township: Wilson, 2051.
 - Buckingham district: Brumell, 214.
- Gravel: Stone, 1777, 1781.
- Illinois: Leighton, 1076.
 - Missouri: Dake, 441.
 - Ontario: Ledoux, 1063.
- Graptolitoidea.**

Greenland.

Geology: Bøggild, 157.

Historical geology.

Northwestern Greenland: Koch, 1033.

Mineralogy.

Dahlite, Kangerdluarsuk: Bøggild, 158.

Leifite, Narsarsuk: Bøggild, 159.

Paleontology.

Arallas, Cretaceous: Fritel, 625.

Greensand. See Glauconite.

Ground ice, northern Alaska: Leffingwell, 1074.

Ground water. *See* Underground water.

Guatemala.*Economic geology.*

Salt peter: Gale, 632.

Physical geology.

Earthquakes: Muñoz Lumbier, 1361.

Gulf coast salt domes: Hill, 823.

Gumbotil, origin: Kay, 963.

Gunflint iron district, Minnesota: Broderick, 198.

Gypsum: Stone, 1782, 1784.

United States: Stone, 1785.

Hackberry stage, Devonian, Iowa: Fenton, 580.

Harricaw-Turgeon basin, northern Quebec: Tanton, 1813.

Hawaiian Islands.*Petrology.*

General: Powers, 1486.

Physical geology.

Halemaumau: Finch, 593; Jagger, 895.

Kilauea: Jagger, 895.

activity: MacCaughey, 1163.

composition of gases: Shepherd, 1688.

lava tube: Powers, 1485.

volcano observatory: Cross, 425.

Mauna Loa, gases: Shepherd, 1689.

Selsmometric investigation of lava column: Jagger, 896.

Volcanoes: Hawaiian Volcano Observatory, 763; Jagger, 896.

Mazleton district, British Columbia: O'Neill, 1390.

Heart Mountain overthrust, Wyoming: Hewett, 811.

Helium: Rogers, 1570; in natural gases: McLennan, 1192.

Hematite and magnetite, relations: Broderick, 196.

Herman-Morris folio, Minnesota (no. 210): Sardeson, 1600.

Heterolasma foersteli, Niagaran tetracoral, Michigan: Ehlers, 540.

Highwood coal area, Alberta: Rose, 1576.

Historical geology (general). *For regional see names of States. See also the different systems; Correlation; Geologic formations, tables.*

Contorted strata: Winchester, 2059.

Gulf Coastal Plain: Shaw, 1683.

Identification of geological formations: Udden, 1880.

Interior coal fields: Keyes, 983.

Mississippian: Keyes, 999.

Mud-crack horizons, Ordovician: Kindle, 1007.

Permo-Carboniferous deposition conditions: Case, 298.

Principles of correlation: Berry, 144.

Rocky Mountain region: Dake, 445.

Silurian-Devonian boundary: Schuchert, 1635.

Taconic system resurrected: Schuchert, 1625.

History, philosophy, etc.

General: McNairn, 1194.

Iowa: Keyes, 997.

State surveys: Merrill, 1273.

U. S. Geological Survey: Inst. Govt. Research, 891.

Hogshooter gas sand, Oklahoma: Berger, 123.

Hoodoos, miniature: Schroeder, 1583.

Hornitos: Sapper, 1599.

Hudson submarine channel: Daly, 458.

Huronian. *See* Pre-Cambrian.

Hydrated ferric oxides: Posnjak, 1482.

Hydrocarbons.

Utah: Bardwell, 68.

Hydromagnesite.

British Columbia, Clinton district: Reinecke, 1537.

Hydrotalcite group: Fosbarg, 613.

Hydrozoa.

Cryptozoon: Rothpletz, 1582.

Serpulites, affinities: Price, 1494.

Ice, physical properties: Matsuyama, 1230.

Ice crystals, fossil: Udden, 1878.

Ice age. *See* Glacial geology.

Ice ages (ancient).

Alaska, southeastern, Paleozoic: Kirk, 1011.

Banded clays: Sayles, 1606.

Cobalt conglomerate, origin: Coleman, 382.

Till argillites, Pre-Cambrian, Permian, and Pleistocene: Lane, 1054.

Idaho.

General: Livingston, 1109.

State Bureau of Mines and Geology, report: Thompson, 1840.

Areas described.

Fort Hall Indian Reservation: Mansfield, 1211.

Pine Creek district: Jones, 944.

Seven Devils district: Livingston, 1111.

Yellow Pine cinnabar district: Larsen, 1059.

Economic geology.

Antimony: Thomson, 1839.

Boise Basin district: Ballard, 62.

Bunker Hill lode, Wardner: Rickard, 1551.

Cinnabar, near Black Pine: Larsen, 1057.

Clays: Skeels, 1711.

Coal, eastern Idaho: Mansfield, 1216.

Horseshoe district, Teton basin: Evans, 553.

Cobalt, Lemhi County: Hess, 803.

Copper, Seven Devils district: Livingston, 1111.

Gold, silver, copper, lead, and zinc: Gerry, 644, 646.

Gypsum: Stone, 1785.

I. X. L. copper prospect, Adams County: Bell, 116.

Manganese: Livingston, 1110.

Mineral resources: Bell, 115, 118.

Mining districts: Varley, 1906.

Mining industry, 1918, 1919: Bell, 117, 118.

Molybdenum: Livingston, 1110.

Oil shale: Condit, 395.

Quicksilver: Livingston, 1110.

Salt deposits: Phalen, 1469.

South central Idaho: Umpleby, 1893.

Tin: Livingston, 1110.

Tungsten: Livingston, 1110.

Yellow Pine cinnabar district: Larsen, 1059.

Historical geology.

Bozeman beds: Keyes, 998.

Coeur d'Alene district: Shannon, 1673.

Eastern Idaho: Mansfield, 1216.

South Central Idaho: Umpleby, 1893.

Triassic and Jurassic, southeastern Idaho: Mansfield, 1214.

Wasatch and Salt Lake formations, southeastern Idaho: Mansfield, 1213.

Mineralogy.

Anglesite, Coeur d'Alene district: Shannon, 1661, 1676.

Boulangerite, Mullan: Shannon, 1678.

Brannerite, Stanley Basin: Hess, 804.

Calcite, Pioneererville district: Shannon, 1676.

Jamesonite containing silver, Owyhee County: Shannon, 1678.

Linarite and leadhillite, Wardner: Shannon, 1664.

Naumannite, Silver City district: Shannon, 1679.

Tetrahedrite, Pine Creek district: Shannon, 1676.

Idaho—Continued.

Petrology.

Coeur d'Alene district : Shannon, 1673.

Physical geology.

Rocky Mountain structure, southeastern Idaho : Mansfield, 1212.

Identification of geological formations : Udden, 1880.

Igneous and volcanic rocks. *See also* Intrusions; Magmas.

Alaska, Anvik-Andreafski region : Harrington, 751.

Chichagof Island, western part : Overbeck, 1411.

Kahiltna Valley : Mertie, 1282.

Kennecott : Bateman, 98.

Klwallik-Koyuk region : Harrington, 755.

northern, Canning River region : Leffingwell, 1074.

Porcupine district : Eakin, 530.

Talkeetna Mountains, western : Capps, 293.

Tolstoi district : Harrington, 752.

Arizona, Ray-Miami region : Ransome, 1507.

Jerome district, Yavapai County : Reber, 1522.

Tucson and Amole Mountains : Jenkins, 901.

Belcher Islands, Hudson Bay : Moore, 1341.

British Columbia, Alnsworth district : Schofield, 1619.

Vancouver Island, East Sooke Peninsula : Cooke, 402.

California, San Diego County : Ellis, 542.

Sunset-Midway field : Pack, 1415.

Classification, quantitative mineralogical : Johannsen, 928.

Colorado, Platoro-Summitville district : Patton, 1454.

Routt and Moffat counties : Perini, 1461.

Routt County : Crawford, 416.

Twin Lakes district : Howell, 924.

Composition, texture, classification, description, and occurrence : Iddings, 885.

Costa Rica : Sears, 1642.

Density, calculation from norm : Iddings, 886.

Greenland : Bøggild, 157.

Hawaiian Islands : Powers, 1486.

Illinois, Hardin County : Weller, 1973.

Idaho, Coeur d'Alene district : Shannon, 1673.

Fort Hall Indian Reservation : Mansfield, 1211.

Pine Creek district : Jones, 944.

Seven Devils district : Livingston, 1111.

south central : Umpleby, 1893.

Kansas, Riley County : Moore, 1350.

Maine, Mount Desert Island : Bascom, 87.

Manitoba, Cross-Pipestone area : Alcock, 13.

Knee Lake district : Bruce, 210.

northern : Bruce, 211.

Reed and Wekusko lakes region : Alcock, 10.

Maryland, Elkton quadrangle : Bascom, 86.

Massachusetts, Westfield, gabbroid diabase : Shannon, 1665.

Mexico, Guerrero : Bonillas, 166; Paredes, 1442; Zumpango del Rio : Waltz, 1926.

Hidalgo, El Chico : Wittich, 2071.

Minnesota, Gunflint district : Broderick, 198.

Montana, Sweet Grass Hills : Kemp, 976.

New Brunswick, Burnthill Brook area : Young, 2097.

Newfoundland, southeastern : Buddington, 226.

New Mexico, Mogollon district : Scott, 1641.

northeastern : Garrett, 640.

Pecos Valley : Semmes, 1658.

Puertecito district : Wells, 1978.

Taos range : Gruner, 720.

New York, Adirondacks : Alling, 92.

Igneous and volcanic rocks—Continued.

Porto Rico: Berkey, 124.

Coamo-Guayama district: Hodge, 837.

San Juan district: Semmes, 1655.

Quebec, Coleraine area: Knox, 1030.

Gaspe County, Lemieux: Mailhot, 1199; Mount Albert: Mailhot, 1200.

Harricanaw-Turgeon basin: Tanton, 1818.

northern: Cooke, 403.

Utah: Butler, 255.

Abajo Mountains: Thorpe, 1841.

Tintic district: Lindgren, 1105.

Vermont, Cuttingsville: Eggleston, 588.

central: Richardson, 1544.

Northfield: Richardson, 1545.

Roxbury: Richardson, 1546.

Washington, southwestern: Culver, 428.

Stevens County: Weaver, 1970.

Illinois.

Survey, administrative report, 1916-17: DeWolf, 495.

Areas described.

Brown County: Nebel, 1367.

Colchester and Macomb quadrangles: Hinds, 832.

Goodhope and La Harpe quadrangles: Nebel, 1368.

Hardin County: Weller, 1973.

Hennepin quadrangle: Cady, 267.

La Salle quadrangle: Cady, 267.

Pike and Adams counties: Coryell, 410.

Economic geology.

Central eastern Illinois: Mylius, 1362.

Clay, Mountain Glen, Union County: St. Clair, 1592.

Coal, District V (Saline and Gallatin counties): Cady, 268.

Hennepin quadrangle: Cady, 267.

La Salle quadrangle: Cady, 267.

low-sulphur: Cady, 267.

Gravel and limestone: DeWolf, 496.

Gravel deposits: Leighton, 1076.

La Salle district: Ede, 537.

Mineral industries, map: Christensen, 338.

Mineral resources: Barrett, 83.

Oil and gas prospecting, central eastern Illinois: Mylius, 1362.

Oil possibilities, Brown County: Nebel, 1367; Goodhope and La Harpe quadrangles: Nebel, 1368.

Petroleum: Barrett, 84.

Flat Rock pool, Crawford County: Tough, 1854.

Trenton field: DeWolf, 497.

Pyrite in coal beds: Cady, 269.

Staunton gas pool: Mylius, 1363.

Zinc: Boerliche, 160.

Historical geology.

Chester series: Weller, 1974, 1975.

Devonian: Savage, 1604; southwestern Illinois: Savage, 1605.

Kinderhook group, western Illinois: Moore, 1343.

La Salle anticline: Cady, 270.

La Salle district: Ede, 537.

Loess deposits, Alton: Baker, 59.

New Richmond sandstone, northern Illinois: Cady, 266.

Northeastern Illinois: Anderson, 30.

Orchard Creek shale: Savage, 1602.

Pleistocene: Leighton, 1077.

Saline and Gallatin counties: Cady, 268.

Staunton gas pool: Mylius, 1363.

Thebes sandstone: Savage, 1602.

Mineralogy.

Mineral collections in State Museum: Crook, 418.

Paleontology.

Hardin County: Weller, 1973.

Loess deposits, Alton: Baker, 59.

Illinois—Continued.***Paleontology—Continued.***

Orchard Creek shale: Savage, 1602.

Pleistocene Vertebrata: Hay, 768.

Thebes sandstone: Savage, 1602.

Physical geology.

Central eastern Illinois: Mylius, 1362.

La Salle anticline: Cady, 270.

Physiographic geology.

Chicago area: Salisbury, 1594.

Illinois Valley: Cady, 265.

Monk's Mound, St. Clair County: Crook, 417.

Northeastern Illinois: Anderson, 30.

Southern Illinois: Bonnell, 167.

Underground water.

Artesian waters, northeastern Illinois: Anderson, 30.

Independence shale, Brandon, Iowa: Thomas, 1835.**Indiana.**

Solis, Benton County: Jones, 950.

Carroll County: Erni, 552.

Cass County: Beals, 107.

Whitley County: Shultz, 1690.

Survey, report: Barrett, 75, 80, 81; Logan, 1121.

Economic geology.

Clay, indianalite, Monroe County: Logan, 1117-1119.

Coal, Monroe County: Logan, 1116.

Vigo County: Logan, 1121.

Coal seams, workable: Barrett, 82.

Flints and cherts: Bennett, 121.

Indianalite, origin: Logan, 1118, 1119.

Kaolin: Logan, 1119, 1121.

Mineral resources: Logan, 1121.

Molding sand: Hole, 846.

Natural gas: Wright, 2082.

Oil and gas fields: Barrett, 79; Wright, 2081.

Oil shales: Reeves, 1527.

Petroleum: Bownocker, 184.

Petroleum and natural gas: Logan, 1120.

Pyrite in coals: Barrett, 82.

Sullivan County oil field: Visher, 1920.

Historical geology.

Chester formations, Orange County: Hole, 846.

Chester series, southern Indiana: Malott, 1206.

General: Logan, 1120.

Greene County, eastern: Malott, 1205.

Ordovician, Madison: McEwan, 1174.

Saluda limestone, Madison: Sulzer, 1800.

Paleontology.

Chester formations, Orange County: Hole, 846.

Ordovician, Madison: McEwan, 1174.

Pleistocene Mollusca: Baker, 57.

Physical geology.

Laurel limestone, erosion forms: Sulzer, 1801.

Structural geology: Barrett, 79.

Physiographic geology.

Anderson esker: Reeves, 1526.

Dunes, northwestern Indiana: Barrett, 79.

Greene County, eastern: Malott, 1205.

Knobstone region, southern Indiana: Malott, 1207.

McCormicks Creek: Barrett, 78.

Shades: Barrett, 77.

Indianalite, origin: Logan, 1118, 1119.**Inequalities of sedimentation: Kindle, 1045.****Insecta.**

Culex winchesteri, Cathedral Bluffs, Colorado: Cockerell, 367.

Eocene, Rocky Mountains: Cockerell, 363.

Florida, Vero, beetles: Wickham, 2021.

Hymenoptera, parasitic, Florissant: Cockerell, 368.

Internationalization of mineral resources: Leith, 1079.

Intrusions. *See also* Dikes.

New Mexico, Pecos Valley: Semmes, 1658.

Invertebrates (general). *See also the classes of invertebrates.*

California Academy of Sciences, report of curator: Hanna, 743.

Cannonball fauna: Stanton, 1756.

Devonian, western Tennessee: Dunbar, 526.

Illinois, Orchard Creek shale: Savage, 1602.

Thebes sandstone: Savage, 1602.

Iowa, Fort Dodge, Ste. Genevieve marls: Lees, 1073.

Mexico, Coahuila, Permian: Haack, 724.

Missouri, Kimmswick and Plattin limestones: Foerste, 603.

New York, Martinsburg, Trenton fauna: Clark, 345.

Vernon shale fauna: Ruedemann, 1586.

Portage fauna, Mackenzie River valley: Kindle, 1006.

Pottsville invertebrates, Webster County, West Virginia: Price, 1492.

Report of Museum of Comparative Zoology: Raymond, 1521.

Silurian, Ohio: Foerste, 599.

southwestern Ontario: Williams, 2034.

Texas, Fredericksburg and Washita formations: Adkins, 7.

Weno and Pawpaw formations: Adkins, 6.

Utah, Carboniferous and Triassic: Girty, 661.

West Virginia, Webster County: Price, 1492.

Iowa.

History of Iowa geology: Keyes, 997.

State geologist's report: Kay, 960.

Areas described.

Adair County: Gow, 679.

Cass County: Tilton, 1847.

Clarke County: Tilton, 1846.

Ringgold County: Arey, 35.

Taylor County: Arey, 36.

Economic geology.

Gypsum: Stone, 1785.

Mineral Production, 1916: Kay, 961.

Historical geology.

Aftonian gravels, Union County: Kay, 964.

Boring, Laurens, Pocahontas County: Cable, 264.

Fort Dodge gypsum: Lees, 1072.

Gravel deposits, Louisa and Washington counties: Schoewe, 1615.

Hackberry stage, Devonian: Fenton, 580.

Independence shale, Brandon: Thomas, 1835.

Preglacial Molinegonia River: Keyes, 984.

Ste. Genevieve marls, Fort Dodge: Lees, 1073.

Southwestern Iowa: Smith, 1714.

Wapsipinicon breccias: Norton, 1381.

Wisconsin drift, relation to Iowan drift in Worth County: Cable, 262.

Mineralogy.

Meteorites, Amana: Prior, 1497.

Estherville: Merrill, 1276.

Paleontology.

Echinodermata, Devonian: Thomas, 1832.

Hackberry stage, Devonian: Fenton, 580.

Helicina occulta: Shimek, 1691.

Herpetocrinus, Monticello, Iowa: Thomas, 1834.

Ste. Genevieve marls, Fort Dodge: Lees, 1073.

Southwestern Iowa: Smith, 1714.

wa—Continued.

Physiographic geology—Continued.

- Des Moines valley: Lees, 1071.
- Drift deposits, Des Moines: Keyes, 996.
- Gravel deposits, Louisa and Washington counties: Schoewe, 1615.
- Gumbotil: Kay, 968.
- Iowan-Wisconsin border: Cable, 263.
- Preglacial Molongona River: Keyes, 984.

Underground water.

- Clarke County: Tilton, 1846.
- Iowan-Wisconsin border, Iowa: Cable, 263.
- Ion: Burchard, 231, 233; Harder, 748.
- Arizona, Eureka district, magmatic ore: Ball, 60.
- Bacteria and iron deposition: Harder, 745, 747.
- Belcher Islands, Hudson Bay: Moore, 1341.
- British Columbia, Taseko Valley: Brewer, 194.
- Canada, Arctic regions: Moore, 1342.
- titaniferous ores: Goodwin, 678.
- Chrome iron ore, occurrences: Ross, 1580.
- Cuba: Weld, 1972; Santiago: Kimball, 1002.
- Gogebic Range: Hotchkiss, 865.
- Illinois, Hardin County: Weller, 1973.
- Kentucky: Miller, 1293.
- Lake Superior region: Crowell & Murray, 427; Winchell, 2058.
- Mackenzie: Kindle, 1008.
- Magnetite and hematite, relations: Broderick, 196.
- Mexico, Hidalgo: Paredes, 1443.
- Minnesota, Gunflint district: Broderick, 198.
- Mesabi range: Grout, 716; Wolf, 2074.
- Montana, Stanford hematite district: Westgate, 1985.
- New York, Clinton County: Miller, 1307; Newland, 1374.
- Nova Scotia, sedimentary ores: Hayes, 774.
- Origin: Eng. M. J., 551.
- Ontario: O'Connor, 1386.
- Michipicoten district: Collins, 390, 391.
- Porto Rico, Mayaguez, limonite: Fettke, 589.
- Quebec, Belcher Islands, Hudson Bay: Moore, 1341.
- Texas, eastern: Dumble, 524.
- Wisconsin, Gogebic Range: Hotchkiss, 867.

Isostasy.

- General: Barrell, 72, 73; Brown, 204; Willis, 2049.
- Glaciation and deglaciation: Daly, 458.
- Labrador ice sheet, relations to isostasy: Coleman, 880.
- Mathematics: Chamberlin, 323; MacMillan, 1193.
- Rocky Mountains: Keyes, 995.
- Jack Bay district, Prince William Sound, Alaska: Johnson, 930.
- Jamaica.

Physical geology.

- Earthquakes: Taber, 1806.
- Joints, mechanical interpretation: Bucher, 223.
- Jurassic. *See also* Paleontology, Jurassic.
- Alaska, northern, Canning River region: Leffingwell, 1074.
- Talkeetna Mountains, western: Capps, 293.
- Alberta, Crowsnest coal field, northern part: Rose, 1575.
- British Columbia, Ainsworth district: Schofield, 1619.
- Hazleton: O'Neill, 1390.
- Selkirk Range: Schofield, 1621.
- Slocan area: Bancroft, 66.

190 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1919-1920.

Jurassic—Continued.

- Montana, Fergus County : Freeman, 622.
- New Mexico : Keyes, 993 ; Lee, 1068 ; northeastern : Garrett, 640.
- North America, southern : Stanton, 1754.
- Oregon : Smith, 1728.
- Utah : Butler, 255 ; Dake, 443 ; southeastern : Forrester, 611.
- Wyoming, Lance Creek field : Hancock, 737.
- Maverick Springs : Collier, 389.

Kansas.

Areas described.

- Syracuse and Lakin quadrangles : Darton, 462.

Economic geology.

- Elk City gas field : Boughton, 170.
- Granite ridge, buried, relation to oil fields : Moore, 1851.
- Gypsum : Stone, 1785.
- Mid-Continent oil fields : Bosworth, 169.
- Natural gas : Snider, 1736.
- Natural gases, chemical survey : Allen, 21.
- Oil and gas, Allen and Neosho counties : Moore, 1347.
- Wilson and Montgomery counties : Moore, 1348.
- Oil and gas fields, map : U. S. Geol. Survey, 1895.
- Oil domes, central Kansas, origin : Blackwelder, 153.
- Petroleum : Moore, 1349 ; Snider, 1736.
- Salt deposits : Phalen, 1469.

Historical geology.

- Allen and Neosho counties : Moore, 1347.
- Comanchean and Dakota strata : Twenhofel, 1871.
- Cretaceous : Twenhofel, 1872.
- Eastern Kansas : Fath, 575.
- Elk City gas field : Boughton, 170.
- General : Moore, 1346 ; Snider, 1736.
- Granite boulders, southeastern Kansas : Twenhofel, 1868.
- Granite ridge : Fath, 575 ; Moore, 1351.
- Wilson and Montgomery counties : Moore, 1348.
- Wrexford and Foraker limestones : Twenhofel, 1867.

Paleontology.

- Algal deposits, Carboniferous : Twenhofel, 1869.

Petrology.

- Igneous rock, Riley County : Moore, 1350.

Underground water.

- Syracuse and Lakin quadrangles : Darton, 462.

Kahiltna Valley, Alaska : Mertie, 1282.

Kantishna region, Alaska : Capps, 291.

Kaolin.

Indiana : Logan, 1119, 1121.

North Carolina : Bayley, 104.

Quebec, Amherst township : Willson, 2051.

Kentucky.

- Geology : Miller, 1298.

Areas described.

- Allen County : Miller, 1297 ; Shaw, 1680.
- Barren County : Butts, 259.

Economic geology.

- Bibliography of petroleum, natural gas, asphalt, and oil shale : Jillson, 908.
- Coal : Jillson, 922.
- bibliography : Jillson, 915.
- Clay County : Hodge, 840.
- Clay County, Saxton Creek area : Russell, 1529.

Kentucky—Continued.*Economic geology—Continued.*

- Geologic map: Jillson, 920.
- Glass sands: Richardson, 1547.
- Irvine oil district: St. Clair, 1591.
- Natural gas, eastern Kentucky: Jillson, 907.
- Oil and gas: Jillson, 922, 924.
 - Allen County: Jillson, 913.
 - Barren County: Butts, 259.
 - Breathitt and Knox counties: Jillson, 914.
 - Warren County: Jillson, 919.
- Oil and gas industry, development: Jillson, 906.
- Oil and gas resources: Jillson, 903.
- Oil fields: Glenn, 663; Leonard, 1085.
- Oil shales, Estill County: Crouse, 426.
- Petroleum, Allen County: Miller, 1297; Shaw, 1680.
 - pay oil sands, eastern Kentucky: Jillson, 918.
 - southeastern Kentucky: Jillson, 910.
 - Wier sand horizon: Jillson, 917.
- Paint Creek uplift, Johnson County: Jillson, 925; Rhodes, 1541.
- Stinking Creek region: Jillson, 904.
- Warren County: Jillson, 919.

Historical geology.

- Allen County: Jillson, 913; Shaw, 1680.
- Breathitt and Knox counties: Jillson, 914.
- Geologic map: Jillson, 920.
- Irvine district: St. Clair, 1591.
- Kendrick shale: Jillson, 911.
- Maggoffin County: Browning, 206.
- Mauch Chunk, southeastern Kentucky: Jillson, 910.
- Paint Creek uplift, Johnson County: Jillson, 925; Rhodes, 1541.
- Stinking Creek region: Jillson, 904.
- Warren County: Jillson, 919; Laird, 1047.

Mineralogy.

- Meteorites, Cumberland Falls, Whitley County: Merrill, 1272, 1275; Miller, 1294.
 - 1296, 1298.
- Eagle station: Prior, 1497.
- McCreary County: Miller, 1295.

Paleontology.

- Coal measures invertebrates, eastern Kentucky: Jillson, 921.
- Kendrick shale: Jillson, 911.

Physical geology.

- Eastern Kentucky, structural deformation: Jillson, 909.

Physiographic geology.

- Migration of divide, Floyd County: Jillson, 905.
- Stream capture, Floyd County: Jillson, 905.

Kimmswick and Plattin limestones, Missouri: Foerste, 608.

Kirkland Lake gold area, Ontario: Burrows, 246.

Kiwalik-Koyuk region, Alaska: Harrington, 755.

Knee Lake district, northeastern Manitoba: Bruce, 210.

Kodiak Island, Alaska: Maddren, 1198.

Labrador ice sheet, extent and thickness: Coleman, 380.

Lake Athabasca, origin: Alcock, 15.

Lakes, glacial. *See* Glacial lakes.

Lamellibranchiata. *See* Pelecypoda.

Landslides.

Alaska, Katmai district, Mageik landslide: Griggs, 713.

Colorado, Platoro-Summitville district: Patton, 1454.

Quebec, Portneuf County: Wilson, 2052.

West Virginia, Morgantown, Conemaugh formation: Scheffel, 1612.

Larder Lake gold area, Ontario: Hopkins, 855.

Lava.

Columnar structure in lavas: James, 897.

Hornitos: Sapper, 1599.

Oxidation by steam: Ferguson, 585.

Lead: Slebenthal, 1699, 1701.

Alaska: Martin, 1220.

Arizona: Helkes, 784, 786.

British Columbia, Ainsworth district: Schofield, 1619.

California: Yale, 2093, 2095.

Central States: Dunlop, 527.

Colorado: Helkes, 790; Henderson, 793.

Eastern States: Dunlop, 529; Hill, 822.

Idaho: Gerry, 644, 646.

Pine Creek district: Jones, 944.

Wardner district: Rickard, 1551.

Montana: Gerry, 645; Helkes, 788.

Nevada: Helkes, 782, 785.

New Mexico: Henderson, 789, 792.

Quebec, Gaspé Peninsula: Mailhot, 1203.

Gaspesia: Beidelman, 112.

Oregon: Yale, 2093, 2095.

Rapid formation of lead ore: Wheeler, 1991.

South Dakota: Henderson, 783, 791.

Texas: Henderson, 789, 792.

Utah: Butler, 255; Helkes, 781, 787.

East Tintic district: Goodwin, 672.

Tintic district: Lindgren, 1105.

Washington: Gerry, 644, 646.

Wyoming: Henderson, 788.

Yukon, Twelvemile area: Cockfield, 871.

Leeward Islands.

Paleontology.

Tertiary Mollusca: Cooke, 393.

Lignite: Darling, 460. *See also* Coal.

Alaska, Kantishna region: Capps, 291.

Saskatchewan: MacLean, 1186.

South Dakota: O'Harra, 1887.

Texas: Gentry, 642; eastern: Dumble, 524.

Lime: Loughlin, 1131, 1134.

Limestone.

Vermont: Jacobs, 893.

Lithium: Insley, 890.

Lithology. *See* Petrology.

Lithosphere, structure: Willis, 2049.

Loess.

Illinois, Alton: Baker, 59.

Loess fossils: Shimek, 1691.

Logmeter: Burton, 247.

Louisiana.

Economic geology.

Gypsum: Stone, 1795.

Natural gas: Snider, 1736.

Petroleum: Snider, 1736.

Red River field: Bates, 100.

Red River-Crichton oil field: Bates, 100.

Sabine uplift: Powers, 1493.

Salt deposits: Phalen, 1469.

Salt dome structure: Lucas, 1141.

Salt domes: Wolf, 2072.

Historical geology.

De Soto-Red River oil field: Bates, 100.

Port Hudson beds: Emerson, 549.

Red River-Crichton oil field: Bates, 100.

Sabine uplift: Powers, 1493.

Lower Silurian. *See* Ordovician.

Mackenzie.

Economic geology.

Iron, Mackenzie River valley: Kindle, 1008.

Mackenzie River basin: Camsell, 281; Thompson, 1838.

Historical geology.

Athabaska series: Alcock, 14.

Mackenzie—Continued.**Paleontology.**

Portage fauna, Mackenzie River valley: Kindle, 1006.

Magmas. See also Intrusions.

Crystallization-differentiation: Bowen, 174, 180.

Deformation of crystallizing magma: Bowen, 178.

Differentiation by deformation: Bowen, 179.

Duluth gabbro, basal phases: Nebel, 1369.

Duluth lopolith: Bowen, 174.

Movements in crystallizing magmas: Grout, 719.

Tectonic conditions accompanying intrusion of basic and ultra-basic igneous rocks: Benson, 122.

Magmatic differentiation.

British Columbia, Vancouver Island, East Sooke Peninsula: Cooke, 402.

Magnetite: Dolman, 509; Stone, 1776; Yale, 2094.

British Columbia, Lillooet-Prince George region: Reinecke, 1538.

United States: Phalen, 1470.

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Magnesium: Stone, 1778, 1793.

Magnetite and hematite, relations: Broderick, 196.

Maine.**Historical geology.**

Mount Desert Island: Bascom, 87.

Portsmouth basin: Wandke, 1943.

Mineralogy.

Calcium phosphate mineral, Stoneham: Holden, 844.

Physiographic geology.

Champlain submergence, depth along coast: Meserve, 1289.

Mount Desert Island: Bascom, 87.

Postglacial uplift: Fairchild, 562.

Underground water.

Flowing well, Winslow: Little, 1108.

Mammalia.

Antillean, affinities and origin: Matthew, 1235.

Arctotherium, Texas: Matthew, 1243.

Artiodactyls: Lull, 1146.

Blastomeryx: Lull, 1147.

California, Mohave Desert: Merriam, 1264.

southern coast ranges: Stock, 1770.

Diceratheres: Peterson, 1468.

Edentata, Cenozoic history: Stock, 1768.

Wasatch and Wind River beds: Matthew, 1237.

Entelodonts: Troxell, 1863, 1865.

Equidae, Oligocene: Buwalda, 261.

Felidae, White River beds: Thorpe, 1842.

Florida, Pleistocene: Hay, 764.

Glres, Wasatch and Wind River beds: Matthew, 1237.

Hypisodus: Troxell, 1864.

Insectivora, Wasatch and Wind River beds: Matthew, 1237.

Mastodon, ancestry: Osborn, 1405.

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Moropus, habits: Osborn, 1404.

Mylodon barlani, mounted skeleton: Stock, 1772.

Nebraska, western, Pleistocene: Matthew, 1236.

New York, Orange County, Monroe: Clarke, 358.

Notharctus, Eocene primate: Gregory, 706.

Oreodontidae: Loomis, 1124.

194 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1919-1920.

Mammalia—Continued.

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Man, fossil.

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- Social evolution: Matthew, 1245.
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- Canada: Mackenzie, 1181.
- Colorado: Jones, 948; Mullenburg, 1355.
- Colorado River desert region: Jones, 949.
- Costa Rica: Sears, 1642.
- Cuba: Burch, 228, 229; Burchard, 237, 238.
- Georgia: Hull, 878.
- Idaho: Livingston, 1110.
- Nevada: Pardee, 1441.
- New Mexico: Jones, 945; Wells, 1977.
- New York, Columbia County, postglacial: Dale, 447.
- Northwestern States: Pardee, 1440.
- Nova Scotia: Hayes, 771; western: Faribault, 571.
- Panama, Boqueron River: Sears, 1643.
- Southern States: Stose, 1792.
- Tennessee: Crane, 415.
- Virginia, Blue Ridge, west foot: Stose, 1786.

Manitoba.

Areas described.

- Athapapuskow Lake district: Bruce, 207.
- Cross-Pipestone area: Alcock, 13.
- Knee Lake district: Bruce, 210.
- Reed and Wekusko lakes region: Alcock, 10.
- Reed-File lakes area: Alcock, 11.
- Reed Lake-Elbow Lake: Bruce, 208.
- Wekusko Lake area: Alcock, 12.

Economic geology.

- Chalcopyrite deposits, northern Manitoba: Bruce, 211.
- Copper Lake gold district: Wallace, 1941.
- Falcon Lake district: De Lury, 489.
- Knee Lake district, northern Manitoba: Anon., 2108.
- Maskwa River norite: Colony, 393.
- Northern Manitoba: Wallace, 1939, 1940, 1942.
- Schist Lake region, Mandy mine: Hanson, 744.
- Southeastern Manitoba: Bruce, 209.
- Sulphide deposits, northern Manitoba: Hanson, 744.
- The Pas mineral district: Wallace, 1939.
- Tin, West Hawk Lake region: DeLury, 490.

Historical geology.

- Borings: Dowling, 515.
- Correlation: Dowling, 514.
- Falcon Lake district: DeLury, 489.
- Hudson Bay region: Savage, 1603.

Maps. *See* Geologic maps; Relief maps.

Map making. *See* Cartography.

Marble: Burchard, 236.

Alaska, southeastern: Burchard, 236.

Vermont, Roxbury: Richardson, 1546.

Maryland.

Economic geology.

Chromite deposits: Diller, 500; Lewis, 1096; Singewald, 1708, 1709.

Talc, Harford County: Diller, 504.

Historical geology.

Cambrian: Bassler, 90.

Coal measures: Swartz, 1804.

Cretaceous, Federal Hill, Baltimore: Berry, 141.

Elkton quadrangle: Bascom, 86.

Newark system: Dorsey, 510.

Ordovician: Bassler, 90.

Paleontology.

Cambrian: Bassler, 90.

Canthelophorus, Carboniferous: Bassler, 89.

Coal measures: Swartz, 1804.

Cretaceous, Federal Hill, Baltimore: Berry, 141.

Dinosaur, ornithomimid, Arundel formation: Gilmore, 657.

Ordovician: Bassler, 90.

Pleistocene, peccaries, Cumberland: Gidley, 649.

Vertebrata: Hay, 768.

Petrology.

Elkton quadrangle: Bascom, 86.

Maskwa River norite, Manitoba: Colony, 393.

Massachusetts.

Historical geology.

Dighton conglomerate, origin: Perkins, 1462.

Silurian, Essex County: Foerste, 605.

Unconformity between Berkshire schist and Stockbridge limestone, Adams: Dale, 449.

Mineralogy.

Amesite, Chester: Shannon, 1667, 1675.

Chester emery mine: Shannon, 1663.

Bucholzite, Blandford: Shannon, 1676.

Corundophillite, Chester: Shannon, 1675.

Gedrite, Chesterfield: Shannon, 1676.

Monazite, Weymouth: Palache, 1426.

Pelham asbestos mine: Shannon, 1662.

Westfield, datolite locality: Shannon, 1660.

diabantite: Shannon, 1672.

Paleontology.

Footprint, Attleboro: Lull, 1148.

Mollusca, Boston Basin boulder clay: Morse, 1853.

Petrology.

Gabbroid diabase in Westfield: Shannon, 1665.

Physiographic geology.

Camp Devens area: Atwood, 46.

Cape Cod region: Brigham, 195.

Postglacial uplift: Fairchild, 562.

Matachewan district, northern Ontario: Burrows, 244; Cooke, 401.

Matanuska coal fields, Alaska: Martin, 1219.

Maverick Springs, Fremont County, Wyoming: Collier, 389.

Mayo area, Yukon: Cockfield, 370, 378.

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Mesozoic (undifferentiated)—Continued.

British Columbia, Nickel Plate mountain: Schofield, 1620.

Washington, Stevens County: Weaver, 1970.

Metamorphic rocks, feldspar method of determining: Carlson, 295.

Metamorphism.

California, Riverside County, Crestmore: Eakle, 531.

Duluth gabbro, basal phases: Nebel, 1369.

New York, Lewis County: Buddington, 225.

Tactite: Hess, 849.

Utah, Tintic district: Lindgren, 1105.

Meteor Mountain, Arizona: Boot, 168.

Meteorites.

Amana, Iowa: Prior, 1497.

Chondrules and chondritic structure: Merrill, 1277.

Composition and structure: Merrill, 1268, 1271.

Copper in a meteorite vein: Quirke, 1504.

Cumberland Falls, Kentucky: Merrill, 1272, 1275; Miller, 1294, 1296, 1298.

Eagle Station, Kentucky: Prior, 1497.

Estherville, Iowa: Merrill, 1276.

Etching iron meteorites: Farrington, 574.

Kansas City, Missouri: Merrill, 1270.

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Percentage number of falls with reference to varying basicity: Merrill, 1269.

Richardton, North Dakota: Quirke, 1502, 1503, 1504.

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Instituto Geológico Nacional: Paredes, 1445.

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Petroleum: Iglesias, 888; Shaw, 1682.

indications, Pacific coast: Aguilar, 8.

islands in Gulf of California: Paredes, 1446.

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mineralized areas: Mitchell, 1324.

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Cretaceous, Zumpango, Guerrero: Burckhardt, 240.

Devonian, Coahuila: Haack, 724.

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Mexico—Continued.**Mineralogy.**

Cocinerite, Ramos, San Luis Potosí: Hough, 868.

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Cretaceous, Zumpango, Guerrero: Burckhardt, 240.

Devonian, Coahuila: Haack, 724.

Diatoms, Valle de Toxí, Ixtlahuaca: Díaz Lozano, 498.

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Petrology.

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Physiographic geology.

Hornitos, Jorullo: Sapper, 1599.

Underground water.

Hidalgo, Tlanalapan: Camacho, 275.

Puebla: Valsequillo: Camacho, 276.

Tepeal, Puebla: Díaz Lozano, 499.

Mica: Schaller, 1610.

Michigan.**Economic geology.**

Copper, Lake Superior region: Lang, 1056; Spurr, 1751.

native, Nonesuch formation: Nishio, 1875.

Copper district: Guck, 721; porphyry intrusions: Lang, 1055; Woods, 2077.

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Erosion, Seul Choix Point Peninsula: Ehlers, 539.

Singing sands, Lake Michigan: Richardson, 1548.

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Camp Custer area: Leverett, 1089.

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Shore lines, Elsie and Perrinton quadrangles: Leverett, 1090.

Michipicoten district, Ontario: Collins, 390.

Migration of geosynclines: Grabau, 680.

Military geology.

Engineering geology in and after the war: Berkey, 125.

General: Bennett, 120; Brooks, 202; Bryan, 217.

Geology, use for military purposes: Vaughan, 1912.

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Mineral supplies, United States: McCaskey, 1160.

Mineral water: Ellis, 543, 544.

Colorado: George, 643.

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Crystal structures of calcites: Wyckoff, 2091.

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Hematite and rutile: Merwin, 1286.

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Hydrotalcite group: Foshag, 613.

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Clay: Grout, 714.

Biwabik iron-bearing formation, east Mesabi district: Broderick, 197; nature and origin: Grout, 718.

Iron, Guntint district: Broderick, 198.

Mesabi range: Wolff, 2074.

Lake Superior region: Winchell, 2058.

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Peat: Soper, 1739.

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Historical geology.

East Mesabi range: Grout, 716.

Minnesota—Continued.

Physiographic geology.

South half of Minnesota : Leverett, 1092.

miocene. *See* Tertiary.

miscellaneous. *See also* Addresses.

Agricultural geology : Smith, 1726.

Engineering geology in and after the war : Berkey, 125.

Geologists as expert witnesses : Ransome, 1511.

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Gypsum : Stone, 1785.

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Road-making materials : Lowe, 1140.

Historical geology.

Borings : Lowe, 1139.

Cretaceous : Berry, 129.

General : Lowe, 1139, 1140.

Paleontology.

Cretaceous floras : Berry, 129.

Foraminifera, Byram : Cushman, 434.

Pleistocene plants : Berry, 131.

Mississippian. *See* Carboniferous.

Mississippian orogenic movements : Van Tuyl, 1902.

Missouri.

State geologist, report : Buehler, 227.

Economic geology.

Barite : Tarr, 1817.

Coal : Brodie, 200.

Mineral resources : Buehler, 227.

Sand and gravel resources : Dake, 441.

Historical geology.

Barite areas : Tarr, 1817.

Cooper limestone, central Missouri : Greger, 698.

Devonian, central Missouri : Greger, 697.

General : Dake, 441.

Kimmswick and Platts limestone : Foerste, 608.

Kinderhook group : Moore, 1343.

Section, Warren County to Jackson County : Branson, 190

Mineralogy.

Meteorite, Kansas City : Merrill, 1270.

Mollusca—Continued.

- Cuba, Jurassic: Sánchez Roig, 1596.
 Eocene, Virginia: Van Winkle, 1905.
 Evolution: Grabau, 690.
 Indiana, Pleistocene Mollusca: Baker, 57.
 Loess, Alton, Illinois: Baker, 59.
 Massachusetts, Boston Basin boulder clay: Morse, 1353.
 Nomenclature, rectifications: Henderson, 796.
 Ohio, Logan County, Pleistocene: Baker, 58.
 marl deposits: Sterki, 1762.
 Pleistocene Mollusca: Baker, 57.
 Oregon, John Day Basin: Hanna, 742.
 Porto Rico, Tertiary: Maury, 1250.
 South Carolina, Miocene: Gardner, 689.
 Tertiary, Porto Rico: Hubbard, 876.
 Tertiary and Quaternary, California region: Smith, 1724.
 Texas, Weno and Pawpaw formations: Adkins, 6.
 Trinidad: Van Winkle, 1905.
 West Indies, Tertiary: Cooke, 398.

Molluscoidea. See Brachiopoda; Bryozoa.

- Molybdenum: Hess, 850, 855, 856; Shannon, 1674.
 Alaska, Healy River: Chapin, 332.
 British Columbia, Clinton district: Reinecke, 1587.
 Lillooet-Prince George region: Reinecke, 1538.
 Colorado, Climax: Haley, 731.
 Twin Lakes district: Howell, 874.
 Idaho: Livingston, 1110.
 New Mexico, Taos County: Larsen, 1061.
 Ontario, Ottawa Valley: Wilson, 2053, 2054.
 Renfrew-Calabogie district: Wilson, 2053.
 Quebec, Abitibi: Malliot, 1204.

Montana.*Areas described.*

- Fergus County: Freeman, 622.

Economic geology.

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 Gold, silver, copper, lead, and zinc: Gerry, 645; Helges, 783.
 Gypsum: Stone, 1785.
 Manganese, Butte and Phillipsburg: Pardee, 1440.
 Oil and gas possibilities: Rowe, 1583, 1584.
 Oil shale: Condit, 395.
 Stanford hematite deposits: Westgate, 1985.

Historical geology.

- Belt formation, Helena: Rothpletz, 1581.
 Central Montana: Bowen, 171.
 Helena region: Rothpletz, 1581.
 Huntley field: Hancock, 734.
 Stanford district: Westgate, 1985.
 Western Montana: Condit, 395.

Mineralogy.

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 Boulangerite, Superior: Shannon, 1678.

Paleontology.

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 Plants, Missoula: Jennings, 902.

Petrology.

- Sweet Grass Hills: Kemp, 976.

Physical geology.

- Belt of oblique faulting: Chamberlin, 313.

Moraines.

- Minnesota: Leverett, 1092.

Morrison formation, type section: Lee, 1067.**Mounds.**

- Illinois, St. Clair County, Monk's Mound: Crook, 417.

Mule Creek oil field, Wyoming: Hancock, 736.**Museums.**

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Natural bridges.

Indiana, Shades: Barrett, 77.

Natural gas: Moore, 1345; Northrop, 1379; Panyity, 1435; Sievers, 1703; Westcott, 1984.

Alberta: Dowling, 516.

northern: McLearn, 1188.

Appalachian oil and gas fields, geology: Mills, 1313.

Canada: McLennan, 1192.

Decreasing supply: Bownocker, 185.

Depletion, Appalachian field: Bownocker, 183.

Gasoline content: Dowling, 516.

Illinois, Pike and Adams counties: Coryell, 410.

Staunton gas pool: Mylius, 1363.

Indiana: Barrett, 79; Logan, 1120; Wright, 2081, 2082.

Kansas: Snider, 1736.

Allen and Neosho counties: Moore, 1347.

chemical survey: Allen, 21.

Elk City field: Boughton, 170.

map of oil and gas fields: U. S. Geol. Survey, 1895.

Wilson and Montgomery counties: Moore, 1348.

Kentucky: Jillson, 903, 906, 922, 924.

Allen County: Jillson, 913.

Barren County: Butts, 259.

Breathitt and Knox counties: Jillson, 914.

eastern: Jillson, 907.

Warren County: Jillson, 919.

Louisiana: Snider, 1736.

Mid-Continent fields: Snider, 1736.

Montana: Rowe, 1583, 1584.

North Dakota: Leonard, 1084.

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chemical survey: Allen, 21.

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eastern: Dumble, 524.

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Waters associated with petroleum and natural gas: Mills, 1313.

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Fayette County: Hennen, 797.

Webster County: Reger, 1528.

Wyoming, Fremont County, Big Sand Draw: Collier, 388.

Lance Creek field: Hancock, 737.

Nenana coal field, Alaska: Martin, 1217.

Nebraska.*Economic geology.*

Alkali deposits: Barbour, 67.

Sand: Condra, 396.

Paleontology.

Diceratheres: Peterson, 1468.

Entelodonts: Troxell, 1865.

Felidae, White River beds: Thorpe, 1842.

Pleistocene, western Nebraska: Matthew, 1236.

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Tertiary artiodactyls: Lull, 1147.

Nevada.*Economic geology.*

Divide district: Carpenter, 296; Sizor, 1710; Young, 2098.

Gold, silver, copper, lead, and zinc: Helkes, 782, 785.

Gypsum: Stone, 1785.

Halogen salts of silver, Wonder; Young, 2099.

Nevada—Continued.

Economic geology—Continued.

Manganese: Pardee, 1441.

Colorado River desert region: Jones, 949.

Salt deposits: Phalen, 1469.

Yerington district: Gaby, 630.

Paleontology.

Cestracloont spine, Triassic: Davidson, 466.

Carson footprints, origin: Stock, 1771.

Physiographic geology.

Steptoe Valley: Clark, 347.

Underground water.

Pahrump, Mesquite, and Ivanpah valleys: Waring, 1932.

Steptoe Valley: Clark, 347.

New Brunswick.

Areas described.

Burnthill Brook area: Young, 2097.

Economic geology.

General: Hayes, 771; Wright, 2089.

Oil shales: Simpson, 1706.

Peat: Anrep, 33.

Tungsten, Burnthill Brook area: Young, 2097.

Historical geology.

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General: Bailey, 52; Wright, 2089.

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Newell folio, South Dakota (no. 209): Darton, 461.

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Economic geology.

Coal: Haliburton, 732.

Historical geology.

Cambrian: Howell, 873.

Pre-Cambrian, southeastern Newfoundland: Buddington, 226.

Paleontology.

Stromatocystites: Schuchert, 1627.

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Road materials: Goldthwait, 670.

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Mineralogy.

Beryl Hill, Grafton: Flint, 597.

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New Jersey—Continued.**Paleontology.**

Human remains, Trenton gravels: Wright, 2087.

New Mexico.**Economic geology.**

Copper: Tovote, 1855.

San Pedro, Santa Fe County: Berryman, 147.

Gold, silver, copper, lead, and zinc: Henderson, 789, 792.

Gypsum: Stone, 1785.

Hematite, Socorro County: Foshag, 618.

Manganese: Jones, 945; Wells, 1977.

Mogollon district: Scott, 1641.

Molybdenum, Taos County: Larsen, 1061.

Oil and gas possibilities, Alamosa Creek valley: Winchester, 2061.

Oil possibilities: Knox, 1031.

Oil resources: Knox, 1032.

Oil situation: Ellis, 545.

Ore deposits: Tovote, 1856.

Salt deposits: Phalen, 1469.

San Pedro, Santa Fe County: Berryman, 147.

Historical geology.

Abo sandstone: Böse, 163.

Alamosa Creek valley, Socorro County: Winchester, 2061.

Chaves County: Merritt, 1280.

Eastern New Mexico: Baker, 55.

General: Keyes, 992, 993; Knox, 1031.

Manzano group: Lee, 1068.

Northeastern New Mexico: Garrett, 640.

Pecos Valley: Semmes, 1658.

Pre-Moenkopi unconformity, Colorado Plateau: Dake, 444.

Puertecito district: Wells, 1978.

San Pedro, Santa Fe County: Berryman, 147.

Taos Range: Gruner, 720.

Tertiary intrusives, Pecos Valley: Semmes, 1658.

Paleontology.

Ammonoids, Abo sandstone: Böse, 163.

Reptilia, San Juan County: Gilmore, 656.

Physical geology.

Chaves County: Merritt, 1280.

General: Keyes, 992.

Mountain structure: Darton, 465.

Northeastern New Mexico, structure: Garrett, 640.

Puertecito district: Wells, 1978.

Structure features: Knox, 1031.

New York.

State geologist, report: Clarke, 349.

Areas described.

Canton quadrangle: Chadwick, 310.

Lake Clear region: Ailing, 26.

Lake Placid quadrangle: Miller, 1303.

Schroon Lake quadrangle: Miller, 1304.

Economic geology.

Catskill Portland-cement region: Jones, 951.

Clinton iron ores, genesis: Smyth, 1735.

Gypsum: Stone, 1785.

Iron ores, Clinton County: Miller, 1307, 1309.

Magnetic iron ores, Clinton County: Newland, 1374.

Manganese, postglacial, Columbia County: Dale, 447.

Petroleum: Johnson, 940.

Pyrite and pyrrhotite veins, Jefferson and St. Lawrence counties: Buddington, 224.

Salt deposits: Phalen, 1469.

Silica materials: Colony, 392.

Historical geology.

Adirondacks, geologic history: Miller, 1310; pre-Cambrian: Ailing, 28.

Canton quadrangle: Chadwick, 310.

Catskill Portland-cement region: Jones, 951.

Devonian, western New York: Hussakof, 884.

New York—Continued.

Historical geology—Continued.

- Genesee River region: Fairchild, 561.
- Hanover shale: Chadwick, 309.
- Lake Bonaparte-Lowville quadrangles: Buddington, 225.
- Oriskany sandstone: Eaton, 535.
- Pleistocene history: Fairchild, 564.
- Portage stratigraphy, western New York: Chadwick, 308.
- Pre-Cambrian, Adirondacks: Ailing, 28.
- Saratoga region: Rothpletz, 1582.
- Sherburne sandstone: Grabau, 685.
- Trenton section, Martinsburg: Clark, 345.

Mineralogy.

- Calcite cave in State Museum: Gardner, 638.
- Pyrite, New York City: Whitlock, 2013.
- Sterlingbush calcite cave: Clarke, 360.

Paleontology.

- Armstrongia, Devonian glass sponge: Clarke, 355.
- Bunala woodwardi, Silurian: Clarke, 351, 354.
- Caryocella valcourensis, Chazy limestone: Clark, 346.
- Cryptozoon: Rothpletz, 1582.
- Eurypterid horizon: Chadwick, 307.
- Fishes in museum of Buffalo Society of Natural Sciences: Hussakof, 884.
- Pleistocene Mammalia, Monroe, Orange County: Clarke, 358.
- Proboscidea: Hay, 760.
- Trenton fauna, Martinsburg: Clarke, 345.
- Vernon shale fauna: Ruedemann, 1580.

Petrology.

- Adirondacks, Lyon Mountain region: Miller, 1305.
- Anorthosite gabbro, Saint Lawrence County: Miller, 1311.
- Dolomites, composition: Reed, 1523.
- Lake Bonaparte-Lowville quadrangles: Buddington, 225.

Physical geology.

- Brecciation, Niagara limestone, Rochester: Gilles, 651.
- Faulting, Orleans County: Chadwick, 311.
- Foliation, Lewis County: Buddington, 225.

Physiographic geology.

- Catskill Mountains: Merwin, 1287.
- Cohoes quadrangle: Stoller, 1774.
- Drainage changes, east central New York: Stoller, 1773.
- Drumlins, Lake Placid: Upham, 1897.
- Genesee River region: Fairchild, 561.
- Glaciation, northern New York: Fairchild, 566.
- Lake Placid quadrangle, Pleistocene geology: Ailing, 27.
- Little Falls gorge: Miller, 1308.
- Mechanicsville terraces: Stoller, 1773.
- Niagara cuesta: Grabau, 691.
- Pleistocene marine submergence of the Hudson, Champlain, and St. Lawrence valleys: Fairchild, 556.
- Postglacial waters: Stoller, 1773.
- Rochester Canyon: Fairchild, 561.

Niagara cuesta: Grabau, 691.

Nicaragua.

Economic geology.

- Eastern Nicaragua: Garbrecht, 637.

Physical geology.

- Masaya and Momotombo: Snapper, 1598.
- Nickel: Hess, 800, 805, 807; Rickard, 1550.
- Alaska, Chichagof Island, western part: Overbeck, 1411.
 - Copper River valley: Overbeck, 1412.
 - Magnetic nickel deposits: Lindgren, 1107.
 - Norite occurrences: Coleman, 383.
 - Ontario: Simmersbach, 1704.
 - Cobalt: Whitehead, 2010.
 - Shebandowan deposit: Cross, 421.
 - Sunbury: Bell, 113.
 - Windy Lake region: Knight, 1018.

- ate.
 Guatemala: Gale, 632.
 nomenclature.
 Aulacera: Schuchert, 1626.
 Beatrice: Schuchert, 1626.
 Glossary of mining and mineral industry: Fay, 576.
 Louisian vs. Mississippian: Keyes, 989.
 Mississippian: Keyes, 999.
 Post-Mesozoic: Grabau, 684.
 th Carolina.
 Survey report, 1917-18: Pratt, 1487.
 conomic geology.
 Chromite deposits: Diller, 500; Lewis, 1098.
 Garnet: Katz, 957.
 Hydromica: Bayley, 104.
 Kaolin: Bayley, 104.
 Mineral resources: Pratt, 1488.
 Mining industry, 1913-17: Pratt, 1488.
 Talc, Hewitts: Diller, 504.
 Mineralogy.
 Hydromica: Bayley, 104.
 Paleontology.
 Mesozoic flora: Berry, 143.
 Physiographic geology.
 Dismal Swamp: Osbon, 1399.
 rth Dakota.
 Economic geology.
 Oil and gas possibilities: Leonard, 1084.
 Historical geology.
 General: Leonard, 1082, 1084.
 Western North Dakota: Stanton, 1756.
 Mineralogy.
 Meteorite, Richardton: Quirke, 1502-1504.
 Paleontology.
 Cannonball fauna: Stanton, 1756.
 Physiographic geology.
 Pleistocene deposits, interpretations: Todd, 1849.
 Surface features: Leonard, 1083.
 orthfield, Vermont, terranes: Richardson, 1545.
 ova Scotia.
 Economic geology.
 Cape Breton County: Hayes, 770.
 Carboniferous salt and potash deposits, Cumberland County: Hayes, 775.
 Coal: Hayes, 773.
 General: Hayes, 771; Wright, 2089.
 Iron deposits of sedimentary origin: Hayes, 774.
 Mineral resources: Drummond, 421.
 Salt, Cumberland County: Cole, 376, 378; Hayes, 772.
 Southwestern Nova Scotia: Faribault, 572.
 Western Nova Scotia: Faribault, 570, 571.
 Historical geology.
 Cape Breton County: Hayes, 770.
 General: Wright, 2089.
 Malagash Peninsula, Cumberland County: Hayes, 772.
 Paleogeography of Acadia: Bell, 52.

Ohio—Continued. a

Economic geology.

- Berea sand: Panyity, 1436.
- Coal: Stout, 1795; Muskingum County: Stout, 1794.
- Gypsum: Stone, 1785.
- Petroleum: Bownocker, 184.
- Pyrite in coal: Tucker, 1866.
- Salt deposits: Phalen, 1469.

Historical geology.

- Berea sand, Panyity, 1436.
- Dunkard series: Stauffer, 1757.
- Geologic map: Bownocker, 182.
- Northeastern Ohio: Decker, 483.
- Sedimentary rocks, thickness: Hills, 831.
- Silurian: Foerste, 559.

Paleontology.

- Cystids and blastoids, Cedarville: Foerste, 604.
- Dunkard series: Stauffer, 1757.
- Echinodermata, Brassfield formation: Foerste, 598.
- Marl deposits, Mollusca: Sterki, 1762.
- Pleistocene Mollusca: Baker, 57; Logan County: Baker, 58.
- Silurian: Foerste, 599.

Physical geology.

- Caves, Put-in-Bay, origin: Cottingham, 412.
- Oglvie Range, Yukon: Cockfield, 372.
- Oil-field waters: Rogers, 1566.
- Oil pools, relation to ancient shore lines: Jones, 953.
- Oil shales: Alderson, 16, 17; Hoskin, 864; Roeschlaub, 1561; Trager, 1859; Winchester, 2060.
- Colorado: Chase, 337.
- DeBeque: DeBeque, 482.
- northwestern: Lunt, 1149.
- Indiana: Reeves, 1527.
- Kentucky, Estill County: Crouse, 426.
- Montana, Idaho, Wyoming, and Utah: Condit, 395.
- New Brunswick: Simpson, 1706.
- Ontario, Abitibi River: Williams, 2041.
- Wyoming, Rock Springs area, Sweetwater County: Schultz, 1639.
- southwestern: Schramm, 1621.

Oklahoma.

Economic geology.

- Carbon ratios of coals and relation to petroleum: Fuller, 629.
- Cement oil field, Caddo County: Clapp, 340.
- Gypsum: Stone, 1785.
- Hogshooter gas sand: Berger, 128.
- Kay County, pre-Pennsylvanian oil horizons: Aurin, 50.
- Lead ore, rapid formation: Wheeler, 1991.
- Mid-Continent oil fields: Bosworth, 169.
- Natural gas: Shaw, 1685; Snider, 1736.
- Natural gases, chemical survey: Allen, 21.
- Oil and gas development: Shannon, 1659.
- Oil and gas resources, Osage Reservation: Bowen, 172; Goldman, 665, 667; Ham, 777-780; Hopkins, 854; Robinson, 1559, 1560; Ross 1578.
- Oil-field waters: Rogers, 1567.
- Petroleum: Snider, 1736.
- Osage Nation: Mason, 1224.
- Salt deposits: Phalen, 1464.
- Unconformities, bearing on occurrence of petroleum: Bloesch, 155.

Historical geology.

- Arbuckle Mountains: Decker, 483.
- Cement oil field, Caddo County: Clapp, 340.

Oklahoma—Continued.*Historical geology—Continued.*

- Ouachita Mountains, southern : Honess, 852.
- Pennsylvanian sedimentation around Healdton Island : Merritt, 1279.
- Red beds area : Greene, 695.
- Wreford and Foraker limestones : Twenhofel, 1867.

Paleontology.

- Pleistocene Vertebrata : Hay, 768.

Physical geology.

- Faulting and folding : Fath, 575.
- Osage County, folds : Millikan, 1312.

Underground water.

- Oil-field waters : Rogers, 1567.

Ontario.*Areas described.*

- Abitibi-Night Hawk gold area, Timiskaming district : Knight, 1015.
- Gowganda silver area : Burrows, 245.
- Kirkland Lake gold area : Burrows, 246.
- Larder Lake gold area : Hopkins, 855.
- Matachewan district, northern Ontario : Burrows, 244 ; Cooke, 401.
- West Shiningtree gold area : Hopkins, 856.

Economic geology.

- Abitibi-Mattagami area : Cross, 422.
- Apatite deposits : Spence, 1745.
- Argonaut gold mine : Knight, 1020.
- Clay, Mesozoic, northern Ontario : Keele, 965.
- Clay and shale deposits, Abitibi and Mattagami rivers ; Keele, 966.
- Cobalt : Drury, 522 ; diffusion in vein genesis : Whitman, 2020.
- Cobalt veins : Whitehead, 2010.
- Gold, Ben Nevis area : Knight, 1019.
- Kirkland Lake gold area : Burrows, 246.
- Larder Lake gold area : Hopkins, 855.
- Lightning River gold area : Burrows, 248.
- Gold, Matachewan area : Burrows, 244 ; Cooke, 401, 404.
- Porcupine : Dougherty, 511.
- West Shiningtree area : Hopkins, 856.
- Graphite, Renfrew district : Wilson, 2054.
- Iron : O'Connor, 1386.
- Kirkland Lake district : Cooke, 406 ; Johnson, 934.
- Larder Lake district, northern Ontario : Pearce, 1457.
- Lake Superior region, Port Arthur-Nipigon : Tanton, 1815.
- Lost placers : Coleman, 381.
- Mattagami and Abitibi rivers : Williams, 2040, 2041.
- Michipicoten district : Collins, 390, 391.
- Mineral resources : Gibson, 647 ; Rogers, 1572.
- Molybdenite, Ottawa Valley : Wilson, 2054.
- Renfrew-Calabogie district : Wilson, 2054.
- Montreal River district : Anon., 2106.
- Nickel : Simmersbach, 1704.
- Shebandowan deposit : Cross, 421.
- Windy Lake and other areas : Knight, 1018.
- Northern Ontario : Tanton, 1814.
- Northplains pyrite mines : Hanson, 744.
- Oil and gas geology : Williams, 2037.
- Oil and gas prospects : Williams, 2036.
- Oil fields, southwestern Ontario : Williams, 2035, 2038.
- Oil in Tanton syncline, Kent County : Williams, 2039.
- Ottawa Valley : Wilson, 2053, 2054.
- Peat bogs : Anrep, 34.
- Pitchblende, Butt township : Hore, 862 ; Knight, 1017.
- Porcupine gold field : Bell, 114.
- Pyrite, Calabogie district : Wilson, 2054.
- Goudreau : Collins, 390.
- Report of Bureau of Mines : Ont. Bur. Mines, 1394.
- Report of Department of Mines : Ont. Dept. Mines, 1395.

Ontario—Continued.

Economic geology—Continued.

- Road materials, eastern Ontario: Picher, 1472.
- Sand and gravel: Ledoux, 1063.
- Siderite deposits, Mattagami River: Cross, 422.
- Silurian, southwestern Ontario: Williams, 2034.
- Silver, Gowanda area: Burrows, 245.
- Silver Islet, Thunder Bay district: Tanton, 1816.
- Sudbury nickel-copper deposits: Bell, 113.
- Wasapika gold area, Sudbury district: Hore, 857-861.
- West Shiningtree gold district: Goodwin, 671.

Historical geology.

- Abitibi-Mattagami area: Cross, 422.
- Argonaut gold mine: Knight, 1020.
- Ben Nevis gold area: Knight, 1019.
- Cobalt conglomerate, origin: Coleman, 882.
- Haileyburian intrusives: Miller, 1301, 1302.
- Hudson Bay region: Savage, 1603.
- James Bay region: Savage, 1603.
- Lake Superior region, Port Arthur-Nipigon: Tanton, 1815.
- Michipicoten district: Collins, 390.
- Montreal River district: Anon., 2106.
- Oil and gas geology: Williams, 2037.
- Paleozoic, Mattagami and Abitibi rivers: Williams, 2040, 2041.
- outlier, Lake Timiskaming: Hume, 881.
- south of James Bay: Williams, 2042.
- Patricia: Burwash, 248.
- Pre-Cambrian: Miller, 1300; correlation: Cooke, 407.
- Shebandowan nickel deposit: Cross, 421.
- Silurian, southwestern Ontario: Williams, 2034.
- Steep Rock series: Rothpletz, 1582.
- Timiskaming region: Hume, 881.
- West Shiningtree gold district: Goodwin, 671.
- Windy Lake region: Knight, 1018.

Mineralogy.

- Barite, stalactitic, Madoc: Walker, 1937.
- Echellite, Sextant Portage, Abitibi River: Bowen, 177.
- Elaterite, Madoc: Knight, 1016.
- Fluorite, optical, Madoc: Greenland, 696; Walker, 1938.
- Stephanite, Coleman township: Poitevin, 1478.
- Titanite and polycrase, crystallography: Poitevin, 1477.

Paleontology.

- Pelecypoda, Toronto: Stewart, 1765.
- Silurian, southwestern Ontario: Williams, 2034.
- Steep Rock series: Rothpletz, 1582.

Petrology.

- Butt township, pitchblende deposits country rock: Hore, 863.

Physical geology.

- Erosion by ice sheet: Tyrrell, 1977.

Physiographic geology.

- Timiskaming region: Hume, 881.

Opisthotonos: Dean, 481; Moodie, 1336.

Ordovician. *See also* Paleontology, Ordovician.

- Acadia: Bailey, 53.
- Alabama, northern: Semmes, 1656.
- Alberta, Glacier Lake section: Walcott, 1928.
- Arctic regions, Ellesmere Land: Høltedahl, 850.
- Arkansas: Miser, 1319; Batesville district: Miser, 1320.
- Georgia: McCallie, 1159.
- Greenland, northwestern: Koch, 1033.
- Idaho, Fort Hall Indian Reservation: Mansfield, 1211.
- Illinois, La Salle quadrangle: Cady, 267, 270.
- New Richmond sandstone, northern Illinois: Cady, 268.
- Thebes sandstone: Savage, 1602.
- Indiana, Madison: McEwan, 1174; Saluda limestone: Sulzer, 1800.
- Kentucky: Miller, 1293.

Ordovician—Continued.

- Manitoba, Hudson Bay region: Savage, 1603.
 Reed and Wekusko lakes region: Alcock, 10.
 Reed-File lakes area: Alcock, 11.
 Reed Lake-Elbow Lake: Bruce, 208.
- Maryland: Bassler, 90.
- Minnesota: Grout, 715.
- Missouri: Branson, 190; Kimmswick and Plattin limestones: Foerste, 603.
- Mud-crack horizons: Kindle, 1007.
- New Brunswick: Bailey, 52.
- New Mexico: Keyes, 993; eastern: Baker, 55.
- New York, Canton quadrangle: Chadwick, 810.
 Martinsburg, Trenton section: Clark, 345.
- Ontario, Lake Timiskaming: Hume, 881.
 Mattagami and Abitibi rivers: Williams, 2040.
- Pennsylvania, central: Field, 590.
- Quebec, Coleraine area: Knox, 1030.
- Tennessee: Raymond, 1515.
 Overton County: Butts, 258.
 Rutherford County: Galloway, 633.
 Sumner County: Mather, 1227.
- Texas: Udden, 1880.
- Utah: Butler, 255; Tintic district: Lindgren, 1105.
- Vermont, central: Richardson, 1544.
 Green Mountains, western flank: Dale, 446.
 Northfield: Richardson, 1545.
 Roxbury: Richardson, 1546.
- Virginia: Raymond, 1515.
- Wisconsin, Tomah-Sparta quadrangles: Twenhofel, 1870.
- Ore** deposits, origin. *For ore deposits in general see Economic geology (general).*
- Apatite deposits, Canada: Spence, 1745.
- Arizona, Jerome district, Yavapai County: Reber, 1522.
- Barite, magmatic origin: Lewis, 1097.
 Missouri: Tarr, 1817.
- Bindheimite as an ore mineral: Shannon, 1668.
- British Columbia, Hazleton: O'Neill, 1890.
- Canada, ore bodies in pre-Cambrian: Dougherty, 512.
- Chalcopyrite deposits, northern Minnesota: Bruce, 211.
- Chromite deposits: Diller, 500.
- Cobalt, Ontario: Whitehead, 2010; Whitman, 2020.
- Colorado, Twin Lakes district: Howell, 874.
- Copper, Alaska, Kennecott: Bateman, 98.
 Evergreen ores, Gilpin County, Colorado: McLaughlin, 1184.
 in a meteorite vein: Quirke, 1504.
 Lake Superior region: Lang, 1056; Spurr, 1751.
 native, Nonsuch formation, Michigan: Nishio, 1375.
 Ray-Miami region, Arizona: Ransome, 1507.
- Copper sulphides, La Fleur Mountain, British Columbia: McLaughlin, 1183.
- Diffusion in vein genesis at Cobalt: Whitman, 2020.
- Duluth, gabbro, basal phases: Nebel, 1369.
- Enrichment of tungsten ores: Gannett, 636.
- Fluorspar deposits: Aurand, 48; Hardin County, Illinois: Weller, 1973.
- Formation of ore bodies: Kendall, 977.
- Gold, Ontario, Matachewan district: Cooke, 404.
 Quebec, Lake Demontigny: Mailhot, 1202.
- Iron, Belcher Islands, Hudson Bay: Moore, 1341.
 British Columbia, Taseko Valley: Brewer, 194.
 Clinton ores: Smyth, 1735.
- Cuba, Santiago: Kimball, 1002.
- Gogebic Range: Hotchkiss, 865.
- limonite, Mayaguez, Porto Rico: Fettke, 589.
- magnetic ores, Clinton County, New York: Miller, 1307, 1309.
- Mesabi ores, Minnesota: Grout, 718.
 New York, Clinton County magnetites: Newland, 1374.
- Iron depositing bacteria: Harder, 745.
- Kaolin, Indiana: Logan, 1119.

Ore deposits, origin—Continued.

Lead and zinc ore, formation : Wheeler, 1991.

Location of ores : Bateman, 97.

Magnetite and hematite, relations : Broderick, 196.

Magnetite deposits, eastern Mesabi range : Grout, 716.

Manganese : Harder, 746.

Colorado : Jones, 948.

Cuba : Burchard, 237.

Georgia : Hull, 878.

postglacial, Columbia County, New York ; Dale, 447.

Virginia : Stose, 1786.

Mechanics of vein formation : Taber, 1805.

Mexico : Lewis, 1100 ; Hidalgo, El Chico : Wittich, 2071.

Mineral deposits : Lindgren, 1104.

Minnesota, Mesabi ores : Grout, 718.

Quartz in veins, genesis : Bancroft, 64.

Pyritic deposits in metamorphic rocks : Hanson, 744.

Silver, British Columbia, Stewart district : Dolmage, 508.

native, Nonesuch formation, Michigan : Nishio, 1875.

Ontario, Silver Islet : Tanton, 1816.

Smithsonite, formation : Watson, 1966.

Southwestern ore deposits, age and classification : Wilson, 2055.

Sulphate minerals in ore deposits : Butler, 254.

Sulphides, relation to water level in Mexico : Lucke, 1143.

Tungsten ores, enrichment : Gannett, 636.

Utah : Butler, 253, 255 ; Tintic district : Lindgren, 1105.

Vein formation : Taber, 1805.

Vein quartz, microscopic study : Adams, 5.

Washington : Patty, 1455 ; Stevens County : Weaver, 1970.

Zinc, Tintic district, Utah : Lindgren, 1105.

Wisconsin district : Boericke, 160.

Oregon.

Geology : Smith, 1728.

Report of Bureau of Mines, 1917-18, 1919-20 : Parks, 1448, 1449.

Economic geology.

Gold, silver, copper, and lead : Yale, 2093, 2095.

Gypsum : Stone, 1744.

Mineral resources : Swartley, 1802.

Oil and gas possibilities, western Oregon : Harrison and Eaton, 761.

Potassium nitrate : Nattress, 1365.

Quicksilver, Jackson County : Kellogg, 968.

Waldo district, Josephine County : Kellogg, 969.

Historical geology.

Eagle Creek formation : Chaney, 325.

Pleistocene history : McCormack, 1165.

Waldo district, Josephine County : Kellogg, 969.

Paleontology.

Eagle Creek flora : Chaney, 325, 326.

Echinoidea : Kew, 981.

Mollusca, John Day Basin : Hanna, 742.

Physical geology.

Caves, Josephine County : Williams, 2023.

Earthquakes : Smith, 1732.

Physiographic geology.

Pleistocene history : McCormack, 1165.

Pleistocene submergence, Columbia Valley : Bretz, 192.

Orogeny.

Folded and fault-block mountains, relation : Woodworth, 2078.

General : Chamberlin, 312.

Great Basin ranges : Keyes, 991.

Mississippian orogenic movements : Van Tuyl, 1902.

Rocky Mountain geosynclinal, Canada : Burwash, 250.

Rocky Mountains : Chamberlin, 313 ; Dake, 445 ; Colorado : Chamberlin, 312.

Uphrust faulting : Willis, 2044.

Orthophragmina and Lepidocyelina : Cushman, 435.

Oscillation. *See* Changes of level.

Palangana salt dome, Duval County, Texas : Barton, 85.

Eocene, status and limits: Matthew, 1242.

Paleobotany.

Aralias, Cretaceous: Fritel, 625.

Brandon flora: Berry, 133.

Cantheliophorus, Carboniferous: Bassler, 89.

Cretaceous floras: Berry, 140; Gulf region: Berry, 129.

Cycadeoidea, distribution and relationships: Wieland, 2027.

Cycadophyta, classification: Wieland, 2030.

Dakota flora, age: Berry, 145.

Eagle Creek flora, Oregon and Washington: Chaney, 325.

Eucalyptus: Berry, 132.

General: Guppy, 723; Hollick, 849; Knowlton, 1028; Wieland, 2026.

Hazel, history: Berry, 137.

Hymenaea, Cretaceous, Alabama: Berry, 130.

Linden and ash, history: Berry, 126.

Locust, geologic history: Berry, 127.

Maryland, Federal Hill: Berry, 141.

Mesozoic and Cenozoic plants, catalog: Knowlton, 1027.

Mesozoic floras of North and South America: Knowlton, 1026.

Mississippi, Pleistocene plants: Berry, 131.

Montana, Missoula region: Jennings, 902.

Morrison flora, Colorado: Knowlton, 1029.

New Brunswick: Wilson, 2056.

North Carolina, Mesozoic flora: Berry, 143.

Sequoia, ancestry: Berry, 139.

Sweet gum, history: Berry, 137.

Teaching paleobotany: Berry, 142.

Tennessee, late Cretaceous plants: Berry, 140.

Pleistocene plants: Berry, 131.

Tertiary floras: Berry, 128.

Tetracentron, *Trochodendron*, and *Drimys*: Wieland, 2028.

Texas, trans-Pecos region, Eocene: Berry, 136.

Upper Cretaceous: Berry, 135.

Wood, replacement by dolomite: Adams, 4.

Paleoclimatology.

Alaska: Blackwelder, 151.

Evolution of geologic climates: Knowlton, 1028.

General: Knowlton, 1028; Sayles, 1606; Visser, 1921.

Ordovician: Kindle, 1007.

Paleozoic, late: Case, 299.

Pre-Cambrian, Quebec: Cooke, 403.

Tertiary and Quaternary, California region: Smith, 1724.

Paleogeographic maps.

Devonian: Dunbar, 525; Savage, 1603.

Eocene: Stanton, 1756.

Ordovician: Savage, 1603.

Paleozoic, Atlantic-Arctic region: Hortedahl, 851.

late: Case, 299.

Silurian: Savage, 1603.

Upper Cretaceous: Stanton, 1756.

Paleogeography. See also Geologic history: Paleoclimatology; Paleogeographic maps.

Acadia: Bailey, 53.

Atlantic bridges nonexistent: Matthew, 1240.

Caribbean region: Vaughan, 1910.

Devonian: Grabau, 685.

General: Case, 299; Schuchert, 1637; Ulrich, 1891.

Great Lake region: Grabau, 691.

Little River group delta: Matthews, 1234.

Maryland, Cambrian and Ordovician: Bassler, 90.

Mississippian orogenic movements: Van Tuyl, 1902.

New Mexico: Keyes, 992.

Paleogeography—Continued.

- Tertiary floras: Berry, 128.
 Upper Cretaceous Mississippi Gulf: Berry, 135.
 West Indies: Trelease, 1860.

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 Paleozoic, late: Case, 299.
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 Kansas: Moore, 1346.
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 Maryland, Canthellophorus: Bassler, 89.
 coal measures: Swartz, 1804.
 Mexico, Coahuila, Permian: Haack, 724.
 New Mexico, Abo sandstone ammonoids: Böse, 163.
 Ohio, Dunkard series: Stauffer, 1757.
 Paleozoic, late: Case, 299.
 Permo-Carboniferous ammonoids, Glass Mountains, Texas: Böse, 161.
 Pocono Brachiopoda: Price, 1493.
 Utah, Girty, 661.
 West Virginia, Webster County: Price, 1492.

Cretaceous.

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 Alberta, Edmontosaurus: Lambe, 1049.
 Pelecypoda: McLearn, 1189, 1191.
 Arnillas: Fritel, 625.
 Cannonball fauna: Stanton, 1756; corals: Vaughan, 1916.
 Colorado, northeastern: Henderson, 794.
 Dakota flora, age: Berry, 145.
 Didymotis trinidadensis, Lower Cretaceous, Trinidad: Sommermeier, 1738.
 Fish scales: Cockerell, 366.
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 Kansas: Moore, 1346.
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Paleontology—Continued.***Cretaceous*—Continued.**

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Exogyra: Böse, 162.
 Fredericksburg and Washita formations: Adkins, 7.
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***Devonian*.**

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 Maryland: Bassler, 90.
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 Atlantic Coastal Plain, Pleistocene: Hay, 765.
 Florida, Mammalia and *Pisces*: Hay, 764.
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 Indiana, Pleistocene *Mollusca*: Baker, 57.
 Loess, Alton, Illinois: Baker, 59.
 Maryland, Cumberland, Pleistocene peccaries: Gidley, 649.
 Mississippi, Pleistocene plants: Berry, 181.
 Nebraska, western, Pleistocene: Matthew, 1286.
 Ohio, Logan County, Pleistocene *Mollusca*: Baker, 58.
Pleistocene Mollusca: Baker, 57.
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 Pleistocene: Baker, 56; *Vertebrata*: Hay, 767-769.
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 Texas, Dallas County: Shuler, 1696.

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 Manitoba, Hudson Bay region: Savage, 1603.
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 Ohio: Foerste, 599; Cedarville, cystids and blastoids: Foerste, 604.
 Ontario, Hudson Bay region: Savage, 1603.
 southwestern: Williams, 2034.

Paleontology—Continued.*Silurian*—Continued.

Trilobita : Foerste, 600.

Wisconsin, Racine, cystids and blastoids : Foerste, 604.

Tertiary.

Alaska, Pliocene : Dall, 451.

Pribilof Islands : Dall, 450 ; Hanna, 741.

Artiodactyls : Lull, 1147.

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California, Mohave Desert : Merriam, 1264.

southern, Pisces : Jordan, 954.

southern coast ranges, Vertebrata : Stock, 1770.

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Colorado, Florissant, parasitic Hymenoptera : Cockerell, 368.

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Early Tertiary Bryozoa : Canu, 290.

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Bryozoa : Canu, 289.

decapod Crustacea : Rathbun, 1512.

Foraminifera : Cushman, 432.

Mollusca : Cooke, 398.

Triassic.

Nevada, cestracion spine : Davidson, 466.

Plantae, catalog : Knowlton, 1027.

Utah : Girty, 661.

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General : Moodie, 1331, 1332, 1333, 1334, 1337, 1338.

Opisthotonos : Dean, 481 ; Moodie, 1336.

Parasitic disease : Bather, 102.

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Palladium.

Alaska, Prince of Wales Island : Campbell, 278 ; Mertie, 1284.

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Historical geology.

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General : MacDonald, 1170, 1171 ; Vaughan, 1910.

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Paleontology.

General : Vaughan, 1910.

Panama (including Canal Zone)—Continued.

Physical geology.

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 - Minnesota: Soper, 1739.
 - New Brunswick: Anrep, 33.
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Pelecypoda.

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Peneplains.

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- Pennsylvania.

Areas described.

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Economic geology.

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Historical geology.

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Pennsylvania.—Continued.

Physiographic geology.

Glacial deposits: Williams, 2082.

Kansas pondings: Williams, 2032.

Subordinate ridges: Eaton, 533.

Susquehanna deeps: Daly, 458.

Pennsylvanian. *See* Carboniferous.Pentremites. *See* Blastoides.Permian. *See* Carboniferous.

Petroleum: Andros, 32; Lloyd, 1112; Logan, 1120; McBeth, 1155; Moore, 1345; Northrop, 1378, 1380; Panyity, 1435; Semmes, 1656; Smith, 1721; Van Tuyl, 1904; White, 2005; Ziegler, 2101.

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Classification of undeveloped oil land for valuation: Beal, 106.

Compendium: Ziegler, 2101.

Conditions of occurrence: Harrison and Eaton, 761.

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Gulf coast: Lucas, 1141, 1142; McBeth, 1154; salt domes: Hill, 828; Wolf, 2072.

Illinois: Barrett, 84.

Colchester and Macomb quadrangles: Hinds, 832.

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oil domes, origin: Blackwelder, 153.

Wilson and Montgomery counties: Moore, 1348.

Kentucky: Glenn, 663; Jillson, 903, 906, 922, 924; Leonard, 1085.

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Barren County: Butts, 259.

Breathitt and Knox counties: Jillson, 914.

eastern, pay oil sands: Jillson, 918; Wier sand: Jillson, 917.

Petroleum—Continued.

Kentucky—Continued.

Irvine district: St. Clair, 1591.

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southeastern: Jillson, 910.

Warren County: Jillson, 919.

Louisiana: Snider, 1736.

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Sabine uplift: Powers, 1483.

Mexico: Iglesias, 888; Shaw, 1682.

islands in Gulf of California: Paredes, 1446.

Tamaulipas, Ordoñez, 1396, 1397.

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Montana: Rowe, 1583, 1584.

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Chaves County: Merritt, 1280.

New York: Johnson, 940.

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Oil-field geology: Hager, 729.

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Oklahoma: Shannon, 1659; Snider, 1736.

Cement field, Caddo County: Clapp, 340.

Heraldton field: Merritt, 1279.

Kay County: Aurin, 50.

Osage County, folds: Millikan, 1312.

Osage Nation: Mason, 1224.

Osage Reservation: Goldman, 665, 667; Heald, 777-780; Hopkins, 854; Robinson, 1559, 1560; Ross, 1578.

unconformities: Bloesch, 155.

Ontario: Williams, 2037.

future prospects: Williams, 2036.

Kent County: Williams, 2039.

southwestern: Williams, 2035, 2038.

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Prospecting: Panyity, 1435.

Relation to carbon values in north Texas: Fuller, 628.

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Subsurface relations in oil and gas fields: McCoy, 1168; Mills, 1314.

Symbols for drilling operations: Mehl, 1257.

Tennessee: Glenn, 663.

northern: Nelson, 1373.

Overton County: Butts, 258.

Texas: Snider, 1736; Udden, 1884.

Bend series water problems: Fuller, 626.

Bexar County: Sellards, 1650, 1653.

central: Matteson, 1231.

Petroleum—Continued.

Texas—Continued.

- Coke County: Beede, 108.
- eastern: Dumble, 524.
- Eastland and Stephens counties: Adams, 1.
- Marathon fold: Liddle, 1101.
- north central: Hager, 730.
- northern: Roberts, 1556; Wheeler, 1989, 1990.
- Palangana salt dome: Barton, 85.
- Trinidad: Macready, 1195.
- Water displacement in oil and gas sands: Johnson, 939.
- Water in oil fields: Ambrose, 29.
- Waters associated with petroleum and natural gas: Mills, 1313.

West Virginia: Reger, 1529.

Fayette County: Hennen, 797.

Webster County: Reger, 1528.

Wyoming: Wegemann, 1971.

Lance Creek field: Hancock, 737.

Maverick Springs: Collier, 889.

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Thermopolis district: Collier, 387.

Upton-Thornton oil field: Hancock, 735.

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p. 244. See also Igneous and volcanic rocks; Sedimentary rocks; Technique.

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classification: Mathews, 1228.

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Silicate and carbonate rocks, analysis of: Hillebrand, 830.

Table for determining common rocks: Lane, 1052.

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Tectonic conditions accompanying intrusion of basic and ultra-basic igneous rocks:
 Benson, 122.

Phosphate: Grabau, 682; Stone, 1780.

Canada: Spence, 1745.

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Phosphate rock an economic army: Stone, 1775.

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General: Keyes, 1000.

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Geotectonic adaptation through retardation of the earth's rotation: Keyes, 987.

Ice, physical properties: Matsuyama, 1230.

Joint planes, formation: Wright, 2085.

Mechanical interpretation of joints: Bucher, 228.

Mechanics of geologic structures: Mead, 1252.

Mechanics of vein formation: Taber, 1805.

Migration of geosynclines: Grabau, 680.

Minor folds: Decker, 483.

Mississippian orogenic movements: Van Tuyl, 1802.

Ocean basin, origin: Willis, 2049.

Planetary nuclei, physical phases: Chamberlin, 821.

Planetesimal growth: Chamberlin, 822.

Physical geology (general)—Continued.

- Post-glacial uplift of New England coastal region, Fairchild, 563.
 - Quartz in veins, genesis: Bancroft, 64.
 - Rounding of sand grains by solution: Galloway, 634.
 - Sand grains, rounding by sea urchins: Kindle, 1004.
 - Sea beach observations: Kimp, 971.
 - Selective segregation of material forming earth: Chamberlin, 320.
 - Shore processes: Johnson, 931.
 - Shrinkage of the earth: Chamberlin, 319.
 - Tectonic adjustment of a rotating stratified spheroid: Keyes, 982.
 - Tectonic conditions accompanying intrusion of basic and ultra-basic igneous rocks: Benson, 122.
 - Thrust faulting, process: Quirke, 1506.
 - Upthrust faulting: Willis, 2044.
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 - Fall Line: La Forge, 1041.
 - Flood plains, head of: Tilton, 1848.
 - Hornitos: Sapper, 1599.
 - Hudson submarine channel: Daly, 458.
 - Inclination of surface, determination from contour map: Rich, 1543.
 - Mississippi delta: Malott, 1205.
 - Mountain-glacier erosion, types: Hobbs, 836.
 - Mountain pediments: Bryan, 219.
 - Pleistocene peneplain in Coastal Plain: Cleland, 365.
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 - Textbook: Salisbury, 1593.
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- Piedmont terraces, northern Appalachians: Barrell, 74.
- Pine Creek district, Idaho: Jones, 944.
- Places.
- California, Lompoc: Jordan, 955.
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 - Cestracfont spine, Triassic, Nevada: Davidson, 466.
 - Cretaceous fish scales: Cockerell, 366.
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 - Devonian: Hussakof, 884.
 - Eusthenopteron, structure: Bryant, 221.
 - Florida, Pleistocene: Hay, 764.
 - New York, western, Devonian: Hussakof, 884.
 - Xyne, Santa Barbara County, California: Jordan, 956.
- Plane-table: Bateman, 96.
- Planetary nuclei, physical phases: Chamberlin, 321.
- Planetesimal growth: Chamberlin, 322.
- Planetesimal hypothesis: Daly, 456.
- Plants, fossil. *See* Paleobotany.
- Platinum: Hill, 819, 821, 823; Uglow, 1888.
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 - Kahiltna Valley: Mertie, 1282.
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 Polysoa. *See* Bryosoa.
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 Geology: Berkey, 124.
 Areas described.
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 San Juan district: Semmes, 1655.
 Economic geology.
 Limonite deposits, Mayaguez Mesa: Fettke, 589.
 Historical geology.
 Tertiary formations: Hubbard, 877; Maury, 1250; correlation: Maury, 1248.
 Paleontology.
 Tertiary Mollusca: Hubbard, 876; Maury, 1250.
 Physical geology.
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 Oregon: Nattress, 1365.
 Pre-Cambrian.
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 Ray-Miami region: Ransome, 1507.
 Tucson and Amole Mountains: Jenkins, 901.
 Canada, Arctic regions: Moore, 1342.
 Canadian Rockies: Burwash, 249.
 Colorado, north central, foothills formations: Henderson, 795.
 Twin Lakes district: Howell, 874.
 Delaware, Wilmington quadrangle: Bascom, 86.
 Georgia: McCallie, 1159.
 Greenland, northwestern: Koch, 1033.
 Idaho, Coeur d'Alene district: Shannon, 1673.
 Pine Creek district: Jones, 944.
 Literature: Steidtmann, 1760.
 Mackenzie River basin: Camsell, 281.
 Manitoba, Cross-Pipestone area: Alcock, 13.
 Falcon Lake district: DeLury, 489.
 Knee Lake district: Bruce, 210.
 northern: Bruce, 211; Hanson, 744.
 Reed and Wekusko lakes region: Alcock, 10.
 Reed-File lakes area: Alcock, 11.
 Reed Lake-Elbow Lake: Bruce, 208.
 Wekusko Lake area: Alcock, 12.
 Maryland, Elkton quadrangle: Bascom, 86.
 Michigan, Huronian formations: Allen, 25.
 Minnesota: Grout, 715.
 east Mesabi district: Broderick, 197.
 eastern Mesabi range: Grout, 716.
 Gunfint district: Broderick, 198.

Pre-Cambrian—Continued.

Ontario—Continued.

- Gowganda area: Burrows, 245.
- Halleyburian intrusives: Miller, 1802.
- Kirkland Lake area: Burrows, 246.
- Lake Superior region: Tanton, 1815.
- Lightning River area: Burrows, 243.
- Matachewan district: Burrows, 244; Cook, 401.
- Michipicoten district: Collins, 390.
- northern: Cooke, 407.
- Patricia: Burwash, 248.
- Timiskaming district, Abitibi-Night Hawk gold area: Knight, 1015.
- West Shiningtree area: Hopkins, 856.
- Windy Lake region: Knight, 1018.

Oregon: Smith, 1728.

Quebec: Cooke, 407.

- Amherst township: Wilson, 2051.
- Coleraine area: Knox, 1030.
- Harricaw-Turgeon basin: Tanton, 1813.
- Lake Demontigny region: Mailhot, 1202.
- northern: Cooke, 403.

South Dakota, Black Hills: Runner, 1598.

Steep Rock series: Rothpletz, 1582.

Utah: Butler, 255.

Vermont, Northfield: Richardson, 1545.

Rochester quadrangle: Foye, 620.

Virginia, Blue Ridge, west foot: Stose, 1786.

Precious stones: Schaller, 1609.

Pribilof Islands, Alaska: Hanna, 741.

Prince Edward Island.

Historical geology.

Glacial history: Coleman, 379.

Projecting structure through an angular unconformity: Corbett, 408.

Primates. *See* Mammalia.

Pseudomorphs.

Bismuthinite after molybdenite: Graham, 692.

Colemanite after inyoite, Death Valley, California: Rogers, 1562.

Hematite after goethite: Spencer, 1746.

Limonite after pyrite: Holden, 842.

Pursell trench, origin: Schofield, 1619.

Pyrite: Smith, 1727.

Colorado, Leadville: Lee, 1065.

Illinois, coal beds: Cady, 269.

Indiana: Barrett, 82.

New York, Jefferson and St. Lawrence counties: Buddington, 224.

Ohio coal fields: Tucker, 1866.

Ontario, Calabogie district: Wilson, 2053.

Michipicoten district: Collins, 390.

Ottawa Valley: Wilson, 2053.

Tennessee, coal pyrite: Holbrook, 841.

Pyrrhotite.

New York, Jefferson and St. Lawrence counties: Buddington, 224.

Quartz, microscopic study: Adams, 5.

Quaternary. *See also* Glacial geology; Paleontology, Quaternary.

Alaska, Anvik-Andreafski region: Harrington, 801.

Kantishna region: Capps, 291.

Kodiak Island: Maddren, 1198.

northern, Canning River region: Leffingwell, 1074.

Porcupine district: Eakin, 530.

222 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1919-1920.

Quaternary—Continued.

- Georgia: McCallie, 1159.
- Greenland: Böggild, 157.
- Idaho, Fort Hall Indian Reservation: Mansfield, 1211.
- Illinois, Colchester and Macomb quadrangles: Hinds, 882.
- Kansas: Moore, 1346.
- Syracuse and Lakin quadrangles: Darton, 462.
- Kentucky: Miller, 1293.
- Louisiana, Port Hudson beds: Emerson, 549.
- Maryland, Elkton quadrangle: Bascom, 86.
- Minnesota, Herman, Barrett, Chokio, and Morris quadrangles: Sardeason, 1606.
- Mississippi: Lowe, 1138.
- New Mexico: Keyes, 993.
- northeastern: Garrett, 640.
- Oregon: Smith, 1728.
- Pleistocene history: McCornack, 1165.
- Pleistocene: Hay, 760.
- Pleistocene deposits, age: Hay, 767.
- Porto Rico, Coamo-Guayama district: Hodge, 837.
- South Dakota, Newell quadrangle: Darton, 401.
- Texas, Bexar County: Sellards, 1653.
- Dallas County: Shuler, 1690.
- eastern: Dumble, 524.
- Utah: Butler, 255.

Quebec.

Areas described.

- Amherst township: Wilson, 2051.
- Coleraine sheet: Knox, 1030.
- Harricanaw-Turgeon basin, northern Quebec: Tanton, 1813.
- Lemieux, Gaspé County: Mailhot, 1199.
- Mount Albert, Gaspé County: Mailhot, 1200.

Economic geology.

- Apatite deposits: Spence, 1745.
- Asbestos: Lynch, 1151.
- Eustis mine: Hanson, 7444.
- Gaspesia zinc and lead deposits: Beldelman, 112.
- Gold, Lake Demontigny: Mailhot, 1202.
- Graphite: Brumell, 213; Buckingham district: Brumell, 214.
- Harricanaw River gold area: Mailhot, 1201.
- Huntingdon copper deposit, Eastman: Hore, 858.
- Iron, Belcher Islands, Hudson Bay: Moore, 1341.
- Kaolin, Amherst township: Wilson, 2051.
- Klenawisik gold district: Tanton, 1813.
- Iacorne, Abitibi, molybdenite deposits: Mailhot, 1204.
- Mining operations, 1918, 1919: Denis, 491, 492.
- Peat bogs: Anrep, 34.
- Road materials, Montreal district: Gauthier, 641.
- Vaudreuil County: Picher, 1471.
- Serpentine belt: Knox, 1030.
- Thetford-Black Lake district: Knox, 1030.
- Zinc and lead, Gaspé Peninsula: Mailhot, 1203.

Historical geology.

- Anticosti: Twenhofel, 1873.
- Bonaventure conglomerate, Gaspé: Clarke, 356.
- Glacial history, Magdalen Islands: Coleman, 379.
- Lake Demontigny region: Mailhot, 1202.

Quebec—Continued.**Petrology.**

- Hornblendite, Cantley: Stanfield, 1754.
 Lemieux, Gaspé County: Mailhot, 1199.
 Mount Albert, Gaspé County: Mailhot, 1200

Physical geology.

- Landslide, Portneuf County: Wilson, 2052.

Physiographic geology.

- Gaspé driftless area: Coleman, 380.

Quicksilver: McCuskey, 1161; Ransome, 1508, 1509.

- Anticlinal theory: Udden, 1879, 1883.

- Bibliography: Evans, 554, 555.

- British Columbia, Kamloops Lake: Camsell, 282.

- Vancouver Island, Barkley Sound: Dolmage, 506.

- Idaho: Livingston, 1110.

- Black Pine: Larsen, 1057.

- Yellow Pine district: Larsen, 1059.

- Mexico, San Luis Potosí, Guadalcasar: Wittich, 2067, 2069.

- Oregon, Jackson County: Kellogg, 968.

- Texas: Udden, 1879.

Racine formation, Northern Peninsula, Michigan: Ehlers, 541.**Radian measures in plane-table mapping:** Palmer, 1433.**Radium:** Hess, 800, 805, 806; Penrose, 1460.

- Colorado, Gateway district, carnottite ores: Farnum, 573.

- Ontario, Butt township, pitchblende: Hore, 862; Knight, 1017.

Rare earths: Schaller, 1611.**Relief maps.**

- Canada, Prairie provinces: Dowling, 513.

- Idaho: Varley, 1906.

- Lake Superior region: Winchell, 2058.

- Oregon, western: Harrison and Eaton, 761.

- Rocky Mountain region: Butler, 255.

- Washington: Leighton, 1075.

Reptilia.

- Alberta: Parks, 1450.

- Amphicoelias: Osborn, 1406.

- Antrodemus: Gilmore, 658.

- Barosaurus: Lull, 1145; Wieland, 2029.

- California, Mohave Desert: Merriam, 1264.

- Camarasaurus: Gregory, 709; Osborn, 1406, 1407, 1408.

- Ceratosaurus: Gilmore, 658.

- Desmatosuchus, Triassic, Texas: Case, 303.

- Dimetrodon gigas: Gilmore, 655.

- Dinosaur, ornithomimid, Arundel formation, Maryland: Gilmore, 657.

- Dinosauria: McKelvey, 1180.

- Alberta: Matthew, 1246.

- carnivorous: Gilmore, 658.

- evolution: Matthew, 1238.

- Dromopus? woodworthi: Lull, 1148.

- Edmontosaurus, Alberta: Lambe, 1049.

- General: Ballou, 63.

- Kritosaurus, Belly River formation: Parks, 1451, 1452.

- New Mexico, San Juan County, Eocene and Upper Cretaceous: Gilmore, 656.

- Panoplosaurus, Belly River beds, Alberta: Lambe, 1050.

- Phytosaurus, Triassic, Texas: Case, 303.

- Pterodactyls: Matthew, 1241.

- Stylemys nebrascensis, South Dakota: Case, 301.

- Triceratops: Gilmore, 658.

- Turtles: Gilmore, 654.

Restorations.

- Aletomeryx: Lull, 1147.

- Antrodemus: Gilmore, 658.

- Brachiosaurus: McKelvey, 1180.

- Camarasaurus: Osborn, 1407.

- Ceratosaurus: Gilmore, 658.

- Dimetrodon gigas: Gilmore, 655.

Restorations—Continued.

- Eusthenopteron : Bryant, 221.
- Helderberg fauna : Clarke, 352.
- Mammalla, Black Hills region : O'Harra, 1399.
- Pterodactyls : Matthew, 1241.
- Quaternary vertebrates : Osborn, 1409.
- Triceratops : Gilmore, 653.
- Trilobite, ventral surface : Raymond, 1520.

Rhode Island.

Economic geology.

- General : Thomas, 1836.

Historical geology.

- Dighton conglomerate, origin : Perkins, 1462.

Physiographic geology.

- Postglacial river changes : Brown, 205.

- Postglacial uplift : Fairchild, 562.

- Rigidity of the earth : Michelson, 1291.

- Ripple mark : Bucher, 222.

Road materials.

- Arkansas : Branner, 189.

- Mississippi : Lowe, 1140.

- New Hampshire : Goldthwait, 670.

- Ontario, eastern : Picher, 1472.

- Quebec, Montreal district : Gauthier, 641.

- Vaudreuil County : Picher, 1471.

- Saskatchewan, Regina area : Reinecke, 1586.

- Texas : Nash, 1864.

- Washington : Leighton, 1075.

- Rochester quadrangle, Vermont : Foye, 620.

- Rock classification for engineering : Pirsson, 1473 ; Smith, 1729.

- Rock products and the war : Loughlin, 1130.

- Rock rivers : Bailey, 54.

- Rock slides. *See* Landslides.

- Rock tanks and charcos, origin : Bryan, 215.

- Rocks. *See* Igneous and volcanic rocks ; Sedimentary rocks.

- Rocks, structural features.

- Coquina, Florida : Brodie, 199.

- Ice crystals, fossil : Udden, 1878.

- Ripple mark : Bucher, 222.

- Rocks described. *See* list p. 244.

- Rounding of sand grains by solution : Galloway, 634.

- Roxbury, Vermont, terranes : Richardson, 1546.

- Sabine uplift, Louisiana : Powers, 1483.

- St. Bartholomew.

Paleontology.

- Tertiary calcareous Algae : Howe, 872.

- Salmon River district, British Columbia : O'Neill, 1398.

- Salt : Stone, 1779.

- Canada : Cole, 377, 378.

- Deposition, principles : Grabau, 688.

- Gulf coast salt domes : Wolf, 2072.

- Mexico, Colima, Cuyutlan area : Paredes, 1444.

- Nova Scotia, Malagash, Cumberland County : Cole, 376, 378 ; Hayes, 772, 775.

- Origin : Phalen, 1469.

- United States : Phalen, 1469.

- Salt deposition, principles : Grabau, 688.

- Salt domes : Brantley, 191 ; Wolf, 2072.

- Origin : Rogers, 1569 ; Wolf, 2072 ; intrusive origin, Gulf coast : Rogers, 1568.

- volcanic origin theory : DeGolyer, 486.

- Salt cores, origin : Washburne, 1955.

- Stratigraphy, Gulf Coastal Plain : Shaw, 1683.

- Structure : Lucas, 1141.

- Texas, Butler salt dome : Powers, 1484.

- Palangana salt dome : Barton, 85.

- West Point salt dome : DeGolyer, 485.

- Salts, natural : Grabau, 688.

Salvador.*Physical geology.*

San Salvador, eruption : Friedlander, 623.

Sand : Stone, 1777, 1781.

Indiana, molding sand : Hole, 846.

Missouri : Dake, 441.

Nebraska : Condra, 396.

Ontario : Ledoux, 1063.

Rounding of sand grains by solution : Galloway, 034.

Sand chrome ore, Maryland : Singewald, 1709.

Sand grains, rounding by sea urchins : Kindle, 1004.

Sandstone.

Cementation in sandstone : Johnson, 941.

Santo Domingo. *See* Dominican Republic.

Saskatchewan.

Economic geology.

Lignite : MacLean, 1186.

Road materials, Regina area : Reinecke, 1536.

Southeastern Saskatchewan : Stansfield, 1752.

Historical geology.

Athabaska series : Alcock, 14.

Borings : Dowling, 513.

Correlation : Dowling, 514.

Surface deposits, southeastern Saskatchewan : Stansfield, 1752.

Physiographic geology.

Lake Athabasca, origin : Alcock, 15.

Seasonal deposition in aqueo-glacial sediments : Sayles, 1606.

Sedimentary ripples : Bucher, 222.

Sedimentary rocks.

Bend and Ellenburger limestones, microscopic characters : Udden, 1681.

Bend series sediments : Waite, 1924.

Examination of well cuttings : Trager, 1858.

Feldspars : Carlson, 295.

Sedimentation : Louderback, 1125 ; Shaw, 1084, 1689 ; Vaughan, 1917.

Abstraction of potassium during sedimentation : Watson, 1959.

Algal deposits : Twenhofel, 1869.

Banded clays : Sayles, 1606.

California, San Francisco Bay : Louderback, 1125.

Chemical researches on sediments : Morwin, 1288.

Diagenesis : Schuchert, 1636.

Differential compression of sediments : Mehl, 1258.

Dighton conglomerate, origin : Perkins, 1462.

Inequalities of sedimentation : Kindle, 1005.

Ripple mark : Bucher, 222.

Seismology. *See also* Earthquakes.

Azimuth determination in earthquakes : Urrutia, 1899.

General : Townley, 1857.

Geologic theory of earthquakes : Montessus de Ballore, 1328.

Hawaiian lava column, seismometric investigation : Jagger, 896.

Interior of the earth, nature : Adams, 2.

Mexico : Muñoz Lumbier, 1859.

Monthly reports : Humphrey, 882.

Problems : Reid, 1585.

Propagation of earthquake waves : Williamson, 2048.

Seismograph, Chicago : Hibbard, 814.

long-period : Romberg, 1578.

nontilt : Romberg, 1574.

Status of seismological work : Klotz, 1018.

Selenium : Caben, 272 ; Hill, 870, 874.

Serpulites, hydrozoan affinities : Price, 1494.

Shale.

Illinois, Colchester and Macomb quadrangles : Hinds, 832.

Minnesota : Grout, 714.

Ontario, Abitibi and Mattagami rivers : Keele, 966.

Virginia : Ries, 1555.

Shingle : La Forge, 1042.

- Shore lines: Johnson, 932. *See also* Beaches; Terraces.
 Development: Johnson, 932.
 Michigan, Elsie and Perrinton quadrangles: Leverett, 1090.
 Shore processes: Johnson, 932.
 Shrinkage of the earth: Chamberlin, 819.
 Silica: Katz, 958.
 New York: Colony, 392.
 Silurian. *See also* Paleontology, Silurian.
 Acadia: Bailey, 53.
 Arctic regions, Ellesmere Land: Høftedahl, 850.
 Arkansas: Miser, 1819.
 Georgia: McCallie, 1159.
 Greenland: Bøggild, 157.
 northwestern: Koch, 1033.
 Idaho, Fort Hall Indian Reservation: Mansfield, 1211.
 Illinois, Orchard Creek shale: Savage, 1602.
 Kentucky: Miller, 1293.
 Allen County: Miller, 1297; Shaw, 1060.
 Barren County: Butts, 259.
 Little River group delta: Matthews, 1234.
 Manitoba, Hudson Bay region: Savage, 1603.
 Massachusetts, Essex County: Foerste, 605.
 Michigan, Northern Peninsula, Racine formation: Ehlers, 541.
 Middle Siluric: Grabau, 686.
 New Brunswick: Bailey, 52.
 New Mexico: Keyes, 993.
 eastern: Baker, 55.
 New York, Catskill region: Jones, 951.
 Rochester: Giles, 651.
 Ohio: Foerste, 599.
 Ontario, Hudson Bay region: Savage, 1603.
 Lake Timiskaming: Hume, 881.
 Mattagami and Abitibi rivers: Williams, 2041.
 southwestern: Williams, 2044.
 Tennessee, Sumner County: Mather, 1227.
 Utah: Butler, 255.
 Silver: Dunlop, 528; McCaskey, 1162; Wuenach, 2090.
 Alaska: Martin, 1220.
 Arizona: Helkes, 784, 786.
 British Columbia, Ainsworth district: Schofield, 1619.
 Salmon River district: O'Neill, 1393; Prior, 1496.
 Slovan area: Bancroft, 66.
 Stewart district: Dolmage, 503.
 Stump Lake: Camsell, 237.
 California: Yale, 2093, 2095.
 Kern County, Randsburg: Carpenter, 297.
 Central States: Dunlop, 527.
 Colorado: Helkes, 790, 792.
 Platoro-Summitville district: Patton, 1454.
 Eastern States: Dunlop, 529; Hill, 822.
 Idaho: Gerry, 644, 646.
 Wardner district: Rickard, 1551.
 Mexico, Sonora, Arizpe district: Montijo, 1329.
 Montana: Gerry, 645; Helkes, 782.
 Native silver, Nonesuch formation, Michigan: Nishio, 1375.
 Nevada: Helkes, 782, 785.
 Divide district: Sizer, 1710; Young, 2093.
 Wonder, halogen salts: Young, 2093.
 New Mexico: Henderson, 789, 792.
 Mogollon district: Scott, 1641.
 Ontario, Cobalt: Whitehead, 2010.
 Gowganda area: Barrows, 245.
 Silver Islet: Tanton, 1816.
 Oregon: Yale, 2093, 2095.
 Silver Islet, Lake Superior: Channing, 327.
 South Dakota: Henderson, 783, 791.

Iver—Continued.

- Texas: Henderson, 789, 792.
- Utah: Butler, 255; Helges, 781, 787.
 - East Tintic district: Goodwin, 672.
 - Tintic district: Lindgren, 1105.
- Washington: Gerry, 644, 646.
 - Stevens County: Weaver, 1970.
- Wyoming: Henderson, 788, 791.
- Yukon, Mayo area: Cockfield, 370, 373; Johnson, 938.
 - Twelvemile area: Cockfield, 371.
- nging sands: Fairchild, 565; Fippin, 595; Ledoux, 1064; Lake Michigan: Richardson, 1548.
- nk holes.
 - Kentucky, Allen County: Shaw, 1680.
- late: Loughlin, 1183.
 - Vermont, Northfield: Richardson, 1545.
- lides. *See* Landslides.
- locan area, British Columbia: Bancroft, 66.
- nake Creek fauna: Matthew, 1236.
- oapstone: Diller, 503.
- oda.
 - British Columbia, Clinton district: Reinecke, 1587.
 - Lillooet-Prince George region: Reinecke, 1588.
- odium salts: Wells, 1979, 1980, 1981.
- olls.
 - Barbados: Harrison, 759.
 - Formation: Muir, 1357.
 - Indiana, Benton County: Jones, 950.
 - Carroll County: Erni, 552.
 - Cass County: Beals, 107.
 - Whitley County: Shilts, 1690.
 - Wisconsin, Door County: Whitson, 2022.
 - Milwaukee County: Whitson, 2023.
 - north central: Whitson, 2021.
- South Carolina.
 - Paleontology.*
 - Mollusca, Miocene: Gardner, 639.
- South Dakota.
 - Badlands: O'Harra, 1388.
 - Report of State geologist: Ward, 1944, 1947.
 - Areas described.*
 - Newell quadrangle: Darton, 461.
 - Economic geology.*
 - Chalk: Ward, 1946.
 - Gold, silver, copper, and lead: Henderson, 788, 791.
 - Gypsum: Stone, 1785.
 - Harding County, oil and gas possibilities: Ward, 1945.
 - Lignite: O'Harra, 1387.
 - Oil possibilities, southern margin of Black Hills: Morse, 1354.
 - Historical geology.*
 - Black Hills pre-Cambrian: Runner, 1588.
 - Western South Dakota: Stanton, 1756.
 - White River Badlands: O'Harra, 1389.

South Dakota—Continued.

Physical geology.

Caves, Black Hills: Johnson, 937.

Physiographic geology.

General: Visser, 1919.

Underground water.

Black Hills: Darton, 463.

Newell quadrangle: Darton, 461.

Spongiae.

Armstrongia, Devonian glass sponge: Clarke, 355.

Cambrian, British Columbia: Walcott, 1932.

Glass-sponge colonies: Clarke, 357.

Silicispongiae, Cretaceous: O'Connell, 1382.

Springs, classification: Bryan, 216.

Stanford hematite deposits, Montana: Westgate, 1985.

Stone: Loughlin, 1132, 1135.

Monumental stones: Dale, 448.

Strategy of minerals: Smith, 1716.

Stratigraphic. *See* Historical geology.

Stream capture.

Alaska, Tolovana and Hess River basins: Mertie, 1281.

Indiana, southern, Knobstone region: Malott, 1207.

Kentucky, Floyd County: Jillson, 905.

Stromatoporoiden.

Aulacera: Schuchert, 1626.

Beatricea: Schuchert, 1626.

Strontium: Stose, 1790, 1793.

Structural geology. *See* Physical geology.Structural materials. *See* Building stone; Clay, etc.Study and teaching. *See* Educational.

Subordinate ridges, Pennsylvania: Eaton, 533.

Subsidence. *See* Changes of level.Subterranean water. *See* Underground water.

Sulphate minerals in ore deposits: Butler, 254.

Sulphur: Smith, 1727.

Alaska, Unalaska and Akun Islands: Maddren, 1197.

Geological aspects of sulphur in coal: Ashley, 42.

Gulf coast salt domes: Wolf, 2072.

Mexico, San Luis Potosi, Cerritos: Wittich, 2068.

Origin: Henning, 798.

Sulphur compounds in coal, origin: Thiessen, 1826.

Volcanic sulphur, source: Papiush, 1437.

Sunloch copper district, British Columbia: Dolmage, 507.

Surveys.

Arkansas: Branner, 188.

Canada, summary report, 1917, 1918: McInnes, 1175, 1176.

Connecticut: Conn. G. S., 397; Gregory, 704.

Florida, State geologist's report: Sellards, 1644.

History of State surveys: Merrill, 1273.

Idaho, report: Thomson, 1840.

Illinois, report 1916-17: DeWolf, 495.

Indiana, report: Barrett, 75, 80, 81; Logan, 1121.

Mexico: Paredes, 1445.

Mississippi, report, 1916-17: Lowe, 1137.

Missouri, report of State geologist: Buehler, 227.

National geological survey, functions and ideals: Ransome, 1510.

New Jersey, report of State geologist: Kummel, 1036, 1038.

North Carolina, report 1917-18: Pratt, 1487.

South Dakota, report of State geologist: Ward, 1947.

Tennessee, report of State geologist: Nelson, 1370, 1371.

United States Geological Survey: Blackwelder, 152; Inst. Govt. Research, 891.

annual report, 1918-19, 1919-1920: Smith, 1715, 1720.

as a civic institution during the war: Paige, 1416.

mineral resources work: Bastin, 95.

reports: Smith, 1719.

Vermont, State geologist, report: Perkins, 1463.

ys—Continued.

Virginia, report 1916-17, 1918-19: Watson, 1960, 1967.

Wisconsin, report of director: Hotchkiss, 866.

Whanna deeps: Daly, 458.

ps.

Central America, coastal swamps: MacDonald, 1172.

Mismal Swamp: Osbon, 1399.

ols for drilling operations: Mehl, 1257.

use-Lakin folio, Kansas (no. 212): Darton, 462.

s of formations. *See* Geologic formations, tables.

ic system resurrected: Schuchert, 1625.

ie: Hess, 799.

Diller, 503.

High-grade talc for gas burners: Diller, 504.

North Carolina and Maryland: Diller, 504.

Vermont, Roxbury: Richardson, 1546.

etna Mountains, western, Alaska: Capps, 293.

: La Forge, 1042.

lum: Hess, 806.

Range, New Mexico: Gruner, 720.

dique.

barometric surveying in petroleum mapping: Lahee, 1045.

Crystal structure model: Whitlock, 2017.

Dip components, graphic determination: Lahee, 1043; Palmer, 1432.

Dip needle, use: Aldrich, 18.

Dionometer, two-circle: Bascom, 88; Palache, 1417.

Inclination of surface, determination from contour map: Rich, 1543.

ogrometer: Burton, 247.

Measuring folded beds: Hewett, 813.

Mineralogy methods at Butte, Montana: Billingsley, 149.

Model for demonstrating crystal structure: Whitlock, 2017.

Models for determining structure of bedded rocks: Mehl, 1256.

Notebook and symbols for petroleum geologists: Woodruff, 2076.

Ores and metals, examination in polarized light: Wright, 2084.

Plane-table: Bateman, 96.

Polarized light in the study of ores and metals: Wright, 2083.

Preparing mineral specimens: Levison, 1094.

Projecting structure through an angular unconformity: Corbett, 408.

Reconnaissance mapping: Fuller, 627.

Reflecting microscope: Davy, 476.

Sismographic method for underground observations: Udden, 1886.

Symbols for drilling operations: Mehl, 1257.

Telescopic alidade, manipulation: Mather, 1225.

Tilt adjustment of a rotating straticulate spheroid: Keyes, 982.

Trium: Hill, 820, 824.

sssee.

Tate geologist, report: Nelson, 1370, 1371.

as described.

Lutherford County: Galloway, 633.

nomio geology.

Ball clays, western Tennessee: Schroeder, 1623.

Barite, eastern Tennessee: Gordon, 674.

Coal pyrite: Holbrook, 841.

Canganese: Crane, 415; Stose, 1792; Appalachian Valley: Stose, 1789.

Oil and gas resources, Sumner County: Mather, 1227.

Oil exploration, Sumner County: Nelson, 1372.

Oil fields: Glenn, 663; northern Tennessee: Nelson, 1373.

Oil possibilities, Overton County: Butts, 253.

Tennessee—Continued.

Historical geology—Continued.

Overton County: Butts, 258.

Reelfoot Lake district, western Tennessee: Nelson, 1872.

Sumner County: Mather, 1227.

Upper Cretaceous: Wade, 1922.

Western Tennessee: Nelson, 1872; Schroeder, 1623.

Paleontology.

Cretaceous flora: Berry, 129, 140.

Devonian, western Tennessee: Dunbar, 525, 526.

Pleistocene plants: Berry, 181.

Pleistocene Vertebrata: Hay, 768.

Physical geology.

Erosion feature in western clays: Schroeder, 1624.

Terraces.

Connecticut, New Haven region: Ward, 1948.

Marine terraces: Barrell, 74.

New York, Cohoes quadrangle: Stoller, 1774.

Mechanicsville: Stoller, 1778.

Piedmont terraces, northern Appalachians: Barrell, 74.

Vermont, Connecticut Valley: Fairchild, 557.

Tertiary. *See also* Paleontology, Tertiary.

Alabama, Coastal Plain: Brantley, 191.

Alaska, Chistochina region: Chapin, 880.

Chulitna region, upper: Capps, 294.

Kahlitna Valley: Mertie, 1282.

Kantishna region: Capps, 291.

Kivalik-Koyuk region: Harrington, 755.

Kodiak Island: Maddren, 1198.

Nenana field: Martin, 1217.

northern, Canning River region: Leffingwell, 1074.

Pliocene: Dall, 451.

Pribilof Islands: Hanna, 741.

Talkeetna Mountains, western: Capps, 298.

Tolstoi district: Harrington, 752.

Alberta, southern and central: Slipper, 1612.

southwestern: Stewart, 1768.

Swan Hills, Lesser Slave Lake district: Allan, 20.

Arctic regions, Ellesmere Land: Holthedal, 850.

Arkansas: Miser, 1819.

British Columbia, Lillooet-Prince George region: Reinecke, 1538.

Vancouver Island, Sunloch district: DoImage, 507.

Brandon lignite, age: Berry, 133.

Boseman beds, Rocky Mountain region: Keyes, 996.

California, Eocene divisions: Clark, 841.

Meganos group: Clark, 842.

San Diego County: Ellis, 542.

Santa Barbara County, Santa Ynes River district: Kew, 960.

Simi Valley: Kew, 979.

southern: Jordan, 954.

Sunset-Midway field: Pack, 1415.

Caribbean region: Vaughan, 1910.

Colorado, Twin Lakes district: Howell, 874.

Correlation: Vaughan, 1907, 1910.

Caribbean region: Maury, 1250.

Costa Rica: MacDonald, 1171.

Dominican Republic: Cooke, 400.

Florida: Cushman, 431; Sellards, 1647, 1648.

Everglades section: Sellards, 1646.

Georgia: McCallie, 1159.

Greenland: Bøggild, 157.

Gulf Coastal Plain: Rogers, 1571; Shaw, 1683.

Idaho, Fort Hall Indian Reservation: Mansfield, 1211.

south central: Umpleby, 1898.

southeastern: Mansfield, 1213.

Kansas: Moore, 1346.

Syracuse and Lakin quadrangles: Darton, 462.

Tertiary—Continued.

- Kentucky: Miller, 1293.
- Louisiana, Sabine uplift: Powers, 1483.
- Mackenzie River basin: Camsell, 281.
- Mississippi: Lowe, 1138, 1140.
- Montana, central: Bowen, 171.
- Huntley field: Hancock, 734.
- New Mexico: Keyes, 993; Knox, 1631.
- Alamosa Creek valley: Winchester, 2061.
- northeastern: Garrett, 640.
- Pecos Valley: Semmes, 1658.
- North Dakota: Leonard, 1082.
- western: Stanton, 1756.
- Oregon: Smith, 1728.
- western: Harrison and Eaton, 761.
- Paleocene, status and limits: Matthew, 1242.
- Panama, Canal Zone: MacDonald, 1170, 1171; Vaughan, 1910.
- Porto Rico: Berkey, 124; Hubbard, 877; Maury, 1248.
- Coamo-Guayama district: Hodge, 837.
- San Juan district: Semmes, 1655.
- Santo Domingo, Miocene formations: Maury, 1249.
- Southeastern United States: Vaughan, 1910.
- South Dakota, Black Hills region: O'Harra, 1389.
- Newell quadrangle: Darton, 461.
- western: Stanton, 1756.
- Tennessee, western: Schroeder, 1623.
- Texas: Udden, 1880.
- Amarillo region: Gould, 678.
- Bexar County: Sellards, 1653.
- Butler salt dome: Powers, 1484.
- eastern: Dumble, 524.
- Palangana salt dome: Barton, 85.
- West Point salt dome: DeGolyer, 485.
- Trinidad: Macready, 1195.
- Utah: Butler, 255.
- Washington, southwestern: Culver, 428.
- Stevens County: Weaver, 1970.
- Wyoming, Cody region: Hewett, 811.
- Fremont County, Big Sand Draw: Collier, 388.
- Lance Creek field: Hancock, 737.
- Rock Springs area, Sweetwater County: Schultz, 1639.

Texas.

- Chemical analyses of rocks and minerals: Schoch, 1614.
- Identification of geological formations: Udden, 1880.

Areas described.

- Bexar County: Sellards, 1653.
- Crockett County: Liddle, 1102.
- Dallas County: Shuler, 1696.
- Tarrant County: Winton, 2062.
- Terrell County: Christner, 339.

Economic geology.

- Bend series, water problems: Fuller, 626.
- Bexar County oil fields: Sellards, 1650.
- Chemical analyses of rocks and minerals: Schoch, 1614.
- Diablo Plateau: Beede, 110.
- Eastern Texas: Dumble, 524.
- Gold, silver, copper, lead, and zinc: Henderson, 789, 792.
- Gypsum: Stone, 1785.
- Lignite: Gentry, 642.
- Mid-Continent oil fields: Bosworth, 169.
- Natural gas: Snider, 1736.
- Natural gas resources, central north Texas: Shaw, 1635.
- North Texas oil fields: Roberts, 1556; Wheeler, 1989, 1990.
- Oil fields, north central Texas: Hager, 730.
- Oil possibilities, Diablo Plateau: Beede, 110.
- Oil-bearing formations: Udden, 1884.
- Palangana salt dome, Duval County: Barton, 85.

Texas—Continued.***Economic geology*—Continued.**

- Petroleum: Snider, 1736.
- central Texas: Matteson, 1231.
- Coke County: Beede, 108.
- Eastland and Stephens counties: Adams, 1.
- relation to carbon values in north Texas: Fuller, 628.
- Quicksilver deposits, anticlinal theory: Udden, 1879, 1883.
- Road-building materials: Nash, 1364.
- Salt deposits: Phalen, 1469.
- Salt dome structure: Lucas, 1141.
- Salt domes: Wolf, 2072.
- Seismographic method for underground observations: Udden, 1886.

Historical geology.

- Amarillo region: Gould, 678.
- Balcones fault region: Udden, 1885.
- Bend formation: Girty, 659.
- Bend series, age: Girty, 660.
- Brown County: Walte, 1924.
- central Texas: Moore, 1344.
- Bexar County oil fields: Sellards, 1650.
- Butler salt dome, Freestone County: Powers, 1484.
- Central Texas oil fields: Matteson, 1231.
- Coke County: Beede, 108, 109.
- Diablo Plateau: Beede, 110.
- Eastern Texas: Dumble, 524.
- Eastland and Stephens counties: Adams, 1.
- Ellenburger formation, north central Texas: Sellards, 1652, 1654.
- Fredericksburg and Washita formations, northern Texas: Adkins, 7.
- General: Snider, 1736; Udden, 1880.
- Geologic map: Currier & Company, 429.
- Hudspeth County, Carboniferous formations, correlation: Beede, 111.
- Marathon fold, northwest Texas: Liddle, 1101.
- North central Texas: Hager, 730; Udden, 1887.
- Northern Texas petroleum fields: Pratt, 1489.
- Oil-bearing formations: Udden, 1884.
- Palangana salt dome, Duval County: Barton, 85.
- Pennsylvanian formations, north-central Texas: Plummer, 1475.
- Permo-Carboniferous, Glass Mountains: Böse, 161.
- Ranger oil field: Eckes, 536.
- Weno and Pawpaw formations: Adkins, 6.
- West Point salt dome, Freestone County: DeGolyer, 485.

Paleontology.

- Arctotherium: Matthew, 1248.
- Bend series, central Texas: Moore, 1344.
- Desmatosuchus, Triassic: Case, 303.
- Dimetrodon gigas: Gilmore, 655.
- Eocene flora, trans-Pecos Texas: Berry, 186.
- Exogyra, Cretaceous: Böse, 162.
- Fredericksburg and Washita formations, northern Texas: Adkins, 7.
- Labyrinthodont thoracic shield: Case, 302.
- Lutetia: Harris, 757.
- Pectinidae, Cretaceous: Kniker, 1021.
- Permo-Carboniferous ammonoids, Glass Mountains, Texas: Böse, 161.
- Pleistocene Vertebrata: Hay, 768.
- Phytosaurus, Triassic: Case, 303.
- Tarrant County: Winton, 2062.
- Turritella, Buda, and Georgetown limestones: Ellis, 546.
- Weno and Pawpaw formations: Adkins, 6.

Petrology.

- Bend and Ellenburger limestones, microscopic characters: Udden, 1881.

Physical geology.

- Balcones fault zone: Sellards, 1651.
- Central Texas: Matteson, 1231.
- Coke County, geologic structure: Beede, 109.
- Eastland and Stephens counties, structure: Adams, 1.

-Continued.

local geology—Continued.

Arathorn fold, northwest Texas: Liddle, 1101.

North central Texas: Hager, 730.

Geographic geology.

Miller salt dome, Freestone County: Powers, 1484.

Langana salt dome, Duval County: Barton, 85.

Ground water.

Land series, water problems: Fuller, 626.

Mar County: Sellards, 1653.

Reks.

Chemical analysis of rocks: Washington, 1956.

Geology: Emerson, 550; Grabau, 689; Pirsson, 1474; Price, 1491.

General deposits: Lindgren, 1104.

General geology: Kraus, 1035.

Field geology: Hager, 729.

Geology: Salisbury, 1593.

Geology: Schaller, 1611.

Ill. 827; Knopf, 1024.

Iska, Hot Springs district: Chapin, 333.

Lost River district: Fearing, 577.

Ruby district: Chapin, 334.

Seward Peninsula: Harrington, 753.

Who: Livingston, 1110.

Minnesota, West Hawk Lake region: DeLury, 490.

Virginia, Rockbridge County, Irish Creek: Haney, 739.

Mining district, Utah: Lindgren, 1105.

M: Hess, 800, 805, 806.

Is.

local geology.

Quina, Loggerhead Key, origin: Field, 591.

See also Paleontology, Triassic.

Iska, Chulitna region, upper: Capps, 294.

Northern, Canning River region: Leffingwell, 1074.

otic regions, Ellesmere Land: Hortedahl, 850.

izona, northwestern: Shimer, 1693.

lorado, Montezuma County, McElmo anticline: Coffin, 875.

Connecticut, Meriden area: Waring, 1951.

Denland: Böggild, 157.

Who, Fort Hall Indian Reservation: Mansfield, 1211.

southeastern: Mansfield, 1214.

ozoic of North and South America: Knowlton, 1026.

work system: Dorsey, 510.

w Mexico: Keyes, 993; Lee, 1068.

astern: Baker, 55.

northeastern: Garrett, 640.

Puertecito district: Wells, 1978.

th America, southern: Stanton, 1754.

gon: Smith, 1728.

nnsylvania, Gettysburg area: Stose, 1787.

as: Udden, 1880.

Amarillo region: Gould, 678.

Crockett County: Liddle, 1102.

ah: Butler, 255.

oming, Maverick Springs: Collier, 389.

Thermopolis district: Collier, 387.

na.

pendages: Calman, 274; anatomy, and relationships: Raymond, 1520.

neral: Raymond, 1517.

hadidae, Ordovician: Foerste, 602.

Trinidad—Continued.

Historical geology.

General: Macready, 1195.

Paleontology.

Didymotis trinidadensis, Lower Cretaceous: Sommermeier, 1728.

Mollusca: Van Winkle, 1905.

Triceratops: Gilmore, 653.

Tungsten: Hess, 800, 801, 805; Shannon, 1674.

Alaska, Fairbanks district: Chapin, 331.

Enrichment of ores: Gannett, 636.

Idaho: Livingston, 1110.

Manitoba, southeastern: Bruce, 209.

New Brunswick, Burnthill Brook area: Young, 2097.

Yukon, Mayo area: Cockfield, 370.

Turonian ammonite fauna, Mexico: B5ee, 164.

Twin Lakes district, Colorado: Howell, 874.

Turtles. *See* Reptilia.

Unconformities.

Massachusetts, Adams, Berkshire schist-Stockbridge limestone: Dale, 449.

Oklahoma: Bloesch, 155.

Pre-Moenkopi unconformity, Colorado Plateau: Dake, 444.

Underground water (general). *For regional see names of States. See also Mineral water; Springs.*

Association with petroleum and natural gas: Mills, 1313.

Mid-Continent oil fields: Neal, 1226.

Oil field waters of Gulf coast: Rogers, 1771.

Quantitative estimation: Meinzer, 1260.

Ungulata. *See* Mammalia.Upper Silurian. *See* Silurian.

Upton-Thornton oil field, Wyoming: Hancock, 725.

Uranium: Hess, 800, 805, 806; Keeney, 937; Penrose, 1460.

Wyoming, Lusk: Lind, 1103.

Utah.

Geology: Pack, 1414; Schneider, 1613.

Areas described.

Tintic district: Lindgren, 1105.

Economic geology.

Carnotite, Gateway district: Farnum, 573.

East Tintic district: Goodwin, 672.

Economic minerals: Lewis, 1099.

Farnham anticline, Carbon County: Clark, 344.

Gold, silver, copper, lead, and zinc: Helges, 781, 787.

Gypsum: Stone, 1755.

Hydrocarbons: Bardwell, 68.

Jurassic, southeastern Utah: Forrester, 611.

Mineral industry of Utah: Lewis, 1099.

Mountain Lake contact-metamorphic deposit near Salt Lake City: Rogers, 1565.

Oil shales: Anderson, 16; Condit, 395.

Ophir district: Wichman, 2024.

Ore deposits: Bulter, 253, 255.

Wasatch region: Butler, 252.

Salt deposits: Phalen, 1439.

Historical geology.

Abajo Mountains: Thorpe, 1841.

Book Cliffs coal field: Forrester, 610.

Boxeman beds: Keyes, 998.

Farnham anticline, Carbon County: Clark, 344.

General: Butler, 255.

Jurassic: Dake, 443; southeastern Utah: Forrester, 611.

Ophir district: Wichman, 2024.

Pre-Moenkopi unconformity, Colorado Plateau: Dake, 444.

Tertiary gravels, northern Utah: Keyes, 990.

Mineralogy.

Anglesite, Tintic district: Shannon, 1676.

Economic minerals: Lewis, 1099.

General: Butler, 255.

Hydrocarbons: Bardwell, 68.

Utah—Continued.*Paleontology.*

- Carboniferous and Triassic faunas: Girty, 661.
 Eocene Mammalia, Uinta Basin: Peterson, 1467.

Petrology.

- General: Butler, 255.

Physical geology.

- Abajo Mountains, structural features: Thorpe, 1841.
 Sevier Valley, formation: Young, 2100.
 Thrust faulting, Wasatch region: Butler, 252.

Physiographic geology.

- Abajo Mountains: Thorpe, 1841.

Vanadium: Hess, 800, 805, 806; Keeney, 947; Shannon, 1674.

Vein quartz, microscopic study: Adams, 5.

Vermont.

- State geologist, report: Perkins, 1463.

Areas described.

- Northfield terranes: Richardson, 1545.
 Rochester quadrangle: Foye, 620.
 Roxbury terranes: Richardson, 1546.

Economic geology.

- Barre, granite: Perkins, 1466.
 Limestone: Jacobs, 893.

Historical geology.

- Barre, Mill Stone hill: Perkins, 1466.
 Brandon lignite, age: Berry, 133.
 Cuttingsville, eruptive rocks: Eggleston, 538.
 Green Mountains, western flank: Dale, 446.
 Ordovician, central Vermont: Richardson, 1544.

Paleontology.

- Northfield terranes: Richardson, 1545.
 Ordovician, central Vermont: Richardson, 1544.

Petrology.

- Eruptive rocks, Cuttingsville: Eggleston, 433.

Physiographic geology.

- General: Perkins, 1464, 1465.
 Postglacial sea-level waters, eastern Vermont: Fairchild, 557.

Vertebrata (general). *See also* Amphibia; Aves; etc.

- California, Rancho La Brea: Wyman, 2092.
 General: Osborn, 1409.
 Jaw muscles, phylogeny: Adams, 3.
 Lachrymal bone, evolution: Gregory, 707.
 Marsh collection: Schuchert, 1633.
 Opisthotomos: Dean, 481; Moodie, 1336, 1339.
 Oregon, Pleistocene: McCornack, 1165.
 Outline charts in teaching vertebrate paleontology: Mehl, 1254.
 Pleistocene: Hay, 767, 768.
 Snake Creek fauna: Matthew, 1236.
 Teaching vertebrate paleontology by outline charts: Mehl, 1254.
 West Indies: Matthew, 1239.

Virgin Islands.*Historical geology.*

- General: Vaughan, 1915.

Physical geology.

- Earthquakes: Reid, 1531; 1867-68: Reid, 1533.

Virginia.

- Survey report: Watson, 1960, 1967.

Areas described.

- Tazewell County: Harnsberger, 749.

Economic geology.

- Clays and shales west of Blue Ridge: Ries, 1555.
 Coal, Tazewell County: Harnsberger, 749.
 Glass-sand resources: Watson, 1963.
 Gypsum: Stone, 1785.
 Manganese: Stose, 1792.
 Blue Ridge, west foot: Stose, 1786.
 Appalachian Valley: Stose, 1789.

Virginia—Continued.

Economic geology—Continued.

Peat, Dismal Swamp: Osbon, 1399.

Tin, Irish Creek, Rockbridge County: Haney, 739.

Historical geology.

Blue Ridge, west foot: Stose, 1786.

Ordovician: Raymond, 1515.

Oriskany and Helderberg formations: Holden, 845.

Mineralogy.

Dufrenite, Midvale, Rockbridge County: Gordon, 677.

Manganese minerals, Blue Ridge, west foot: Stose, 1786.

Manganotantalite, Amelia: Lee, 1060.

Paleontology.

Eocene: Van Winkle, 1905.

Physical geology.

Earthquake, Blue Ridge region, September 5, 1919: Watson, 1903; Woolard, 2179.

Physiographic geology.

Blue Ridge, west foot: Stose, 1786.

Dismal Swamp: Osbon, 1399.

Volcanic ash: Smith, 1725.

Volcanic rocks. *See* Igneous and volcanic rocks.

Volcanic gases: Butler, 254.

Volcanism.

Explosions, nature of: Sosman, 1741.

Problems of volcanology: Washington, 1958.

Volcanoes.

Alaska, Katmai: Griggs, 712.

emanations and incrustations: Shipley, 1795.

eruption, character: Griggs, 711; 1912: Fenner, 579.

Valley of Ten Thousand Smokes: Shipley, 1694.

Makushin Volcano: Maddren, 1197.

Costa Rica, Irazu: Tristan, 1862.

Poas Volcano, eruptions: Tristan, 1861.

Hawaii: Hawaiian Volcano Observatory, 768; Jagger, 896.

Halemaumau: Finch, 593; Jagger, 895.

Kilauea: Jagger, 895.

activity: MacCaughey, 1163.

composition of gases: Shepherd, 1688.

lava tube: Powers, 1485.

volcano observatory: Cross, 425.

Mauna Loa, gases: Shepherd, 1689.

Mexico: Waitz, 1927.

Pedregal de San Angel: Wittich, 2065.

Nicaragua, Masaya and Momotombo: Sapper, 1598.

Salvador, San Salvador, eruption: Friedlaender, 628.

Wapsipinicon breccias, Iowa: Norton, 1381.

Washington.

Stevens County: Weaver, 1970.

Economic geology.

Chromite deposits: Diller, 500.

Coal fields, southwestern Washington: Culver, 428.

Copper, Chewelah district: Armstrong, 87.

General: Fischer, 596.

Gold, silver, copper, lead, and zinc: Gerry, 644, 646.

Magnesite: Phalen, 1470.

Chewelah, Stevens County: Dolman, 509; Handy, 738.

Mineral resources: Shedd, 1687.

Ore deposits, geologic features: Patty, 1455.

Road-building sands and gravels: Leighton, 1075.

Stevens County: Weaver, 1970.

Historical geology.

Eagle Creek formation: Chaney, 325.

Geologic history: Weaver, 1969.

Paleontology.

Eagle Creek flora: Chaney, 325, 326.

Echinoidea: Kew, 961.

Washington—Continued.*Physiographic geology.*

Juan de Fuca lobe of Cordilleran ice sheet: Bretz, 193.

Pleistocene submergence, Columbia Valley: Bretz, 192.

Weathering.

Barbados soils: Harrison, 809.

Desert weathering: Hobbs, 884.

Wekusko Lake area, Manitoba: Alcock, 12.**Well cuttings, examination: Trager, 1858.****Well records. See Borings.****Weno formation, Texas Comanchean: Adkins, 6.****West Indies (general). See also names of islands.**

Geology: Vaughan, 1908, 1913.

Historical geology.

Cenozoic history: Vaughan, 1907.

Mesozoic history: Stanton, 1754.

Paleontology.

Bryozoa: Canu, 289.

Foraminifera: Cushman, 432.

Mammalia, affinities and origin: Matthew, 1235.

Tertiary decapod Crustacea: Rathbun, 1412.

Vertebrate: Matthew, 1239.

Physical geology.

Coral reefs, formation: Vaughan, 1911.

Physiographic geology.

Bartlett trough: Taber, 1806.

West Shiningtree gold area, Ontario: Hopkins, 906.**West Virginia.***Areas described.*

Fayette County: Hennen, 797.

Randolph County, Mingo district: Reger, 1528.

Webster County: Reger, 1528.

Economic geology.

Coal, Abram Creek-Stony River field: Ashley, 40.

Coal, Fayette County: Hennen, 797.

Coals, sulphur in: White, 2008.

Natural gas: Reger, 1529.

Petroleum: Reger, 1529.

Salt deposits: Phalen, 1439.

Historical geology.

Boring, I. H. Lake No. 1: White, 2006.

Paleontology.

Pocono Brachiopoda, Tucker County: Price, 1493.

Webster County: Price, 1492.

Physical geology.

Slides in Conemaugh formation near Morgantown: Scheffel, 1612.

Physiographic geology.

Morgantown area: Scheffel, 1612.

Whitleyite: Merrill, 1275.**Wind gaps, northern Appalachians: Barrell, 74.****Windrow formation, upper Mississippi Valley: Thwaites, 1843.****Wind work.**

Dust fall, March 9, 1918: Winchell, 2057.

Wisconsin.

Report of survey: Hotchkiss, 866.

Soils, Door County: Whitson, 2022.

Milwaukee County: Whitson, 2023.

North central Wisconsin: Whitson, 2021.

Economic geology.

Iron, Gogebic Range: Hotchkiss, 865, 867.

Lake Superior region: Winchell, 2058.

Zinc: Boericke, 160.

Historical geology.

Gogebic Range: Hotchkiss, 865, 867.

Paleozoic: Ulrich, 1891.

Tomah-Sparta quadrangles: Twenhofel, 1870.

Wisconsin—Continued.

Paleontology.

Cystids and blastoids, Racine: Feerste, 604.

Wood, replacement by dolomite: Adams, 4.

World view of mineral wealth: Umpleby, 1892.

Wyoming.

Economic geology.

Chromite deposits: Diller, 500.

Gold, silver, copper, and lead: Henderson, 788, 791.

Gypsum: Stone, 1785.

Lance Creek oil and gas field, Niobrara County, Wyoming: Hancock, 737.

Mule Creek oil field: Hancock, 736.

Oil possibilities, Baxter Basin, Sweetwater County: Schultz, 1639.

Oil shale: Condit, 395; southwestern Wyoming: Schramm, 1622.

Petroleum: Wegemann, 1971.

Maverick Springs: Collier, 389.

Thermopolis district: Collier, 387.

Upton-Thornton field: Hancock, 735.

Salt deposits: Phalen, 1469.

Upton-Thornton oil field: Hancock, 735.

Uranium ore, Lusk: Lind, 1103.

Historical geology.

Big Sand Draw anticline, Fremont County: Collier, 388.

Correlation table: Morgan, 1352.

Geologic map: Morgan, 1352.

Green River formation, southwestern Wyoming: Schramm, 1622.

Lance Creek field, Niobrara County: Hancock, 737.

Maverick Springs, Fremont County: Collier, 389.

Mule Creek oil field: Hancock, 736.

Rock Springs area, Sweetwater County: Schultz, 1639.

Thermopolis district: Collier, 387.

Upton-Thornton oil field: Hancock, 735.

Mineralogy.

Chlorite, chromiferous: Shannon, 1675.

Paleontology.

Amphibian (Ototriton), Lysite beds, Bridger Creek: Loomis, 1122.

Cardioceratidae: Reeside, 1525.

Eocene insects: Cockerell, 369.

Notharctus, Eocene primate: Gregory, 706.

Physical geology.

Heart Mountain overthrust, Cody region: Hewett, 811.

Physiographic geology.

Beartooth Plateau, glacial features: Dake, 442.

Yellow Pine cinnabar district, Idaho: Larsen, 1069.

Yukon.

Mayo area: Cockfield, 370, 372.

Ogilvie Range: Cockfield, 372.

Economic geology.

Mayo silver area: Johnson, 933.

Twelvemile area, silver-lead deposits: Cockfield, 371.

Mineralogy.

Epidote, White Horse Rapids: Poitevin, 1478.

Physical geology.

Klutian Glacier: Lambert, 1048.

Zinc: Siebenthal, 1698, 1700.

Arizona: Helkes, 784, 786.

British Columbia, Alnsworth district: Schofield, 1619.

California: Yale, 2093, 2095.

Central States: Dunlop, 527.

Colorado: Henderson, 790, 793.

Eastern States: Dunlop, 529; Hill, 822.

Idaho: Gerry, 644, 646.

Pine Creek district: Jones, 944.

Montana: Gerry, 645; Helkes, 784.

Nevada: Helkes, 782, 785.

New Mexico: Henderson, 789, 792.

Inc—Continued.

Quebec, Gaspesia : Beldelman, 112.

Gaspé Peninsula : Mailhot, 1203.

Smithsonite, formation : Watson, 1966.

Texas : Henderson, 789, 792.

Utah : Butler, 255; Heikes, 781, 787.

Tintic district : Lindgren, 1105.

Washington : Gerry, 644, 646.

Wisconsin district : Boericke, 160.

Zircon : Schaller, 1611.

Occurrence : Meyer, 1290.

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LISTS.

(The numbers refer to entries in the bibliography.)

CHEMICAL ANALYSES.¹

Aegirite, 588.
 Albanite, 1957.
 Alum, 681.
 Alunite, 681.
 Amesite, 1667, 1675.
 Andesite, 255, 1105.
 Andose, 588.
 Anorthosite, 1308.
 Aplite, 402.
 Apthitalite, 616.
 Artesian water, 267.
 Augite andesite, 1454.
 Augite latite, 1105.
 Augite porphyrite, 255.
 Barkevikite, 538.
 Barite, 1937.
 Barytes ore, 880.
 Basalt, 246, 1015.
 Bindheimite, 1668.
 Bismutoplagonite, 1669, 1678.
 Black sands, 1115.
 Boulangerite, 1678.
 Brannerite, 804.
 Braunite, 1317.
 Brine, 631, 1813, 1587.
 Bronzite, 1200.
 Brugnatellite, 613.
 Bucholzite, 1676.
 Cacoclasite, 176.
 Ceclite, 1957.
 Chalcanthite, 1060.
 Chalcode, 1672.
 Chlorite, chromiferous, 1675.
 Chrome ore, 239.
 Chromite, 235.
 Clay, 267, 714, 1119, 1555, 1711, 1794.
 Clay, red, 768.
 Coal, 40, 267, 835, 428, 749, 1116, 1216, 1217, 1528, 1576, 1794, 1796.
 Corundophillite, 1675.
 Cryolite, 1547.
 Dacite, 1507.
 Dahllite, 158.
 Diabantite, 1672.
 Diabase, 1507.
 Diatomaceous earth, 1588.
 Diorite, 1507.
 Dolomite, 1381, 1423, 1717.
 Echellite, 177.
 Enstatite, 1275, 1276.
 Epidote, 1677.

Essexite, 538.
 Feldspar, 86, 104.
 Feldspar porphyry, 246.
 Ferrierite, 692.
 Flagstaffite, 722.
 Foyaitite, 538.
 Gabbro, 86.
 Gedrite, 1676.
 Glass sand, 1547, 1962.
 Glauconite, 1215.
 Goethite, 1482.
 Goslarite, 1060.
 Granite, 211, 1507, 1619.
 Granite gneiss, 211.
 Granodiorite, 86, 255, 1507.
 Graphite ore, 2053.
 Greensand, 1215.
 Gumbotil, 963.
 Hausmannite, 1317, 1320.
 Hematite, 1481.
 Hematite ore, 1985.
 Higginsite, 1428.
 Hornblende, 538.
 Hornblende porphyrite, 255.
 hornblendite, 402, 1753.
 Hydromagnesite, 1537, 1538.
 Hydromica, 104.
 Hydrotalcite, 613.
 Iron ore, 774.
 Italite, 1957.
 Jamesonite, silver-bearing, 1678.
 Kaolin, 104, 1119, 2051.
 Lamprophyre, 246.
 Laurvikite, 538.
 Lava, 255.
 Lead ore, 1105.
 Leifite, 159.
 Lepidocrocite, 1482.
 Lepidolite, 1547.
 Leucitite, 1957.
 Limestone, 255, 267, 590, 749, 880, 1381, 1507, 1794, 1846.
 Limonite, 1482.
 Limonite ore, 589.
 Magnesite, 509.
 Magnetite ore, 716.
 Manganese ore, 287, 746, 771, 1320, 1355, 1786.
 Margarite, 1677.
 Margarodite, 1677.
 Mehanterite, 1060.

¹ The analyses given in Schoch, 1614, are not included in this list.

Metadacite, 86.
 Meteorites, 1268, 1271, 1275, 1276.
 Miaskose, 538.
 Mine water, 1507.
 Mineral waters, 643.
 Missouriite, 1957.
 Monzonite, 255, 1105, 1454.
 Monzonite porphyry, 255.
 Natural gas, 1566.
 Naumannite, 1679.
 Nickel ore, 1412.
 Nordmarkite, 538.
 Norite—micropegmatite, 1018.
 Oil, 1566.
 Oil-field waters, 1566, 1571.
 Olivine gabbro, 402.
 Orendite, 1957.
 Orthoclase, 1547.
 Paraffin dirt, 1681.
 Paragneiss, 10.
 Parahopelite, 1936.
 Peat, 1399.
 Peckhamite, 1276.
 Pelhamite, 1662.
 Peridotite, 589, 1200.
 Petroleum, 735, 1566.
 Platinum ore, 762.
 Plazolite, 619.
 Porphyry, 255.
 Prehnite, 1765.
 Prochlorite, 1677.
 Pulaakite, 255, 538.
 Pyrite ore, 390.
 Pyroaurite, 613.
 Quartz-blotite latite, 1454.
 Quartz diorite, 255.
 Quartz diorite porphyry, 1507.
 Quartz monzonite, 255, 1507.
 Quartz porphyry, 1105.
 Quartzite, 880.

Quartzite, feldspathic, 226.
 Rhyolite, 226, 255, 1016, 1105, 1507.
 Rhyolite porphyry, 226.
 Salt, 1469.
 Saltpeter, 632.
 Sand, 441.
 Sandstone, 226, 441, 1547.
 Sarcopsalide, 843.
 Scapolite, 1677.
 Schist, 1507.
 Serpentine, 86, 1015.
 Serpentine rock, 589.
 Shale, 325, 1119.
 Siderite, 390.
 Slate, feldspathic, 226.
 Sodalite-nephelinite syenite, 538.
 Sodium salts, 1537.
 Spencerite, 1936.
 Stichtite, 613.
 Stilpnomelane, 1631, 1676.
 Syenite, 246.
 Syenite porphyry, 255.
 Talc, 504.
 Tavolaitite, 1957.
 Tetrahedrite, 1676.
 Thaumassite, 617.
 Tinguaitite, 538.
 Toscanose, 1105.
 Trachyte, 255.
 Triplite, 1676.
 Turgite, 1481.
 Umptekite, 538.
 Venansite, 1957.
 Vesbite, 1957.
 Vicoite, 1957.
 Volcanic gases, 254, 1688, 1689.
 Vonsenite, 532.
 Water, 30, 462, 643, 745, 1215, 1313, 1507, 1566, 1846, 1951, 1979.
 Xanthosiderite, 1482.

MINERAL ANALYSES.

Andesite, 255.
 Andose, 538.
 Anorthosite, 1303, 1304.
 Augite porphyrite, 255.
 Blindheimite, 1668.
 Diabase, 1303, 1304.
 Gabbro, 86, 1303, 1304.
 Gabbro-diorite, 1303.
 Gneiss, 1303, 1304.
 Granite, 1304, 1507.
 Granitic syenite, 1304.
 Granodiorite, 86.
 Hornblende porphyrite, 255.
 Hydromica, 104.
 Itallite, 1957.
 Laurvikose, 538.

Lava, 255.
 Metadacite, 86.
 Meteorite, Cumberland Falls, Ky., 1275.
 Miaskose, 538.
 Monzonite, 1507.
 Nordmarkose, 538.
 Porphyry, 255.
 Quartz monzonite, 874, 1507.
 Rhyolite, 255.
 Rhyolite schist, 1507.
 Serpentine rock, 589.
 Syenite, 1304.
 Syenite-granite, 1303.
 Talc, 504.
 Tehamose, 1507.
 Trachyte, 255.

MINERALS DESCRIBED.

Achtagdite, 614.
 Albite, 692, 1477.
 Allanite, 1965.
 Alunite, 254, 1507.
 Amesite, 1667, 1675.

Analcite, 1908.
 Anglesite, 1661, 1676.
 Anhydrite, 254.
 Anorthite, 1453.
 Anthophyllite, 181, 1676.

- Apophyllite, 1208.
 Apatite, 616.
 Arsenolite, 614.
 Axinite, 1479.
 Backströmite, 609.
 Barite, 254, 1563, 1987, 2012, 2050.
 Beryl, 597.
 Blende, 1668.
 Biotite, 1507.
 Bismutoplagonite, 1669, 1678.
 Boulangerite, 1678.
 Boussingaultite, 1058.
 Brannerite, 804.
 Braunite, 1817, 1820.
 Bruggenite, 618.
 Bucholzite, 1676.
 Cacoclasite, 176.
 Calamine, 1478, 1986.
 Calcite, 1208, 1676, 1978.
 Cerussite, 1480, 1936.
 Chalcedony, 5.
 Chalcocite, 1507.
 Chalcodite, 1672.
 Chalcopyrite, 1952, 1208, 1507, 1993.
 Chancanite, 1060.
 Chesterite, 1182.
 Chlorite, chromiferous, 1675.
 Chrysocolla, 1507.
 Chubutite, 608.
 Cinnabar, 614.
 Cobalt minerals, 522.
 Coccolite, 609, 868.
 Columbite, 1723, 1984.
 Copper, 1507.
 Corundophyllite, 1675.
 Creedite, 254.
 Cummingtonite, 1676.
 Cuprite, 1507.
 Dahllite, 158.
 Danburite, 614.
 Datolite, 1635, 1208, 1660, 1676.
 Diabantite, 1208, 1672.
 Dufrenoyte, 677.
 Echelette, 177, 609.
 Elaterite, 1016.
 Epidesmine, 676.
 Epidote, 1478, 1677.
 Epsomite, 1985.
 Ferrazite, 609.
 Ferrierite, 608, 692.
 Flagstaffite, 722.
 Fluorite, 696, 1677, 1938.
 Fluorspar, 1978.
 Friedellite, 614.
 Gageite, 614.
 Galena, 1978.
 Ganophyllite, 1568.
 Gavitte, 609.
 Gedrite, 1676.
 Glauconite, 664.
 Gmelinite, 1208.
 Goethite, 1482, 1746.
 Goslarite, 1060.
 Gypsum, 254.
 Hausmannite, 1817, 1820, 1568.
 Hauynite, 254.
 Hematite, 618, 1286, 1746.
 Hibbenite, 1986.
 Higginsite, 1423, 1425.
 Hinsdaleite, 254.
 Högbohmite, 608.
 Hopeite, 1986.
 Hydrotalcite, 618.
 Indianite, 1118.
 Jamesonite, silver-bearing, 1078.
 Laumontite, 1208.
 Leadhillite, 1664.
 Leifite, 159, 608.
 Lepidocrocite, 1482.
 Leucophaenicite, 614.
 Limonite, 1482, 1746, 1786.
 Linarite, 1664.
 Lithiophyllite, 621.
 Malachite, 1507.
 Manganfayalite, 609.
 Manganite, 1820, 1786.
 Manganotantalite, 1066.
 Margarite, 1677.
 Margarodite, 1677.
 Melanterite, 1060.
 Molybdenite, 1507.
 Monasite, 1426, 1994.
 Muscovite, 1507.
 Natrolite, 1208.
 Naumannite, 1679.
 Noselite, 254.
 Olivine, 608.
 Orvillite, 608.
 Ornetite, 609.
 Ozokerite, 68.
 Parahopelite, 1986.
 Pectolite, 1208.
 Pelhamite, 1662.
 Phenacite, 692.
 Pitchblende, 862.
 Planchette, 1908.
 Plazolite, 619.
 Polycrase, 1477.
 Prehnite, 1705.
 Prochlorite, 1677.
 Psilomelane, 1820, 1563, 1786.
 Pyrite, 1466, 1955, 1208, 1507, 1996, 2013, 2014.
 Pyroaurite, 618.
 Pyrobelonite, 609.
 Pyrochroite, 1563.
 Pyrolusite, 1820, 1786.
 Quartz, 5, 1208, 1507.
 Racemite, 608.
 Rhodochrosite, 1568.
 Rhodonite, 621.
 Rock asphalt, 68.
 Rutile, 1286.
 Saponite, 692.
 Sarcopsidite, 852.
 Scapolite, 1477, 1677.
 Scheelite, 614.
 Serpentine, 589.
 Shattuckite, 1608.
 Sobralite, 609.
 Spencerite, 1936.
 Sphalerite, 1208, 1507, 1973.
 Spurrillite, 617.
 Stephanite, 1478.

Stichtite, 618.
 Stilbite, 1208.
 Stilpnomelane, 1672, 1676.
 Sulphohalite, 615.
 Tabbyste, 68.
 Tephroite, 1568.
 Tetrahedrite, 1676.
 Thaumassite, 254, 617, 692.
 Titanite, 1477.
 Topaz, 1677.
 Torbenite, 175.

Triplite, 1676.
 Turgite, 1482.
 Turite, 1746.
 Villamanite, 609.
 Vonsenite, 532.
 Wad, 1320, 1786.
 Wiluite, 614.
 Wulfenite, 612.
 Wurtzellite, 68.
 Zebedassite, 608.
 Zincite, 614.

ROCKS DESCRIBED.

Alaskite, 166.
 Andesite, 761, 1105, 1655.
 Andesite porphyry, 1542.
 Andesite tuff, 1507.
 Anorthosite, 402.
 Argillite, 1619.
 Augite andesite, 1454.
 Augite gabbro, 402.
 Augite latite, 1105.
 Basalt, 246, 1454, 1486.
 Biotite granite, 1030.
 Bronzite, 1200.
 Camptonite, 1619.
 Dacite, 1507, 1655.
 Diabase, 1507.
 Diorite, 10, 166, 752, 874, 1454, 1655.
 Dunite, 1030.
 Enstatite, 1030.
 Epidosite, 1030.
 Essexite, 538.
 Feldspar porphyry, 246.
 Gabbro, 86, 402.
 Gabbro-diorite, 1030.
 Gneiss, 538, 874.
 Granite, 10, 166, 402, 1030, 1507, 1619, 1655.
 Granite porphyry, 1199.
 Granodiorite, 86, 1507, 1655.
 Granophyre, 1030.
 Harsburgite, 1030.
 Hornblende, 1030, 1753.
 Itelite, 1957.
 Kersantite, 1678.
 Lamprophyre, 246, 1678.
 Latite, 1454, 1655.
 Lava, 1655.
 Leucite, 1957.

Limestone, 538, 1619.
 Marble, 874.
 Metadacite, 86.
 Metagabbro, 86.
 Minette, 1678.
 Monzonite, 1105, 1655.
 Monzonite porphyry, 1454.
 Nephelite basalt, 1486.
 Nordmarkite, 538.
 Odinite, 1678.
 Olivine gabbro, 86, 402.
 Paragneiss, 10.
 Pegmatite, 874.
 Peridotite, 1030, 1200.
 Pulaskite, 538.
 Pyroxene gabbro, 86.
 Pyroxenite, 1030.
 Quartz diorite, 86, 1507.
 Quartz latite, 1655.
 Quartz monzonite, 752, 874, 1030, 1655.
 Quartz monzonite porphyry, 1507.
 Quartz porphyry, 1105, 1501.
 Quartzite, 874.
 Rhyolite, 10, 752, 874, 1105, 1454, 1655.
 Schist, 874, 1542.
 Silicite, 1806.
 Sodalite-nephelite syenite, 538.
 Soda rhyolite, 752.
 Spessartite, 1678.
 Syenite, 246, 1199, 1655.
 Syenite porphyry, 1199.
 Toscanose, 1105.
 Trachyte, 1486, 1655.
 Vesite, 1957.
 Vitrophyre, 1655.
 Vogesite, 1678.
 Websterite, 1030.

GEOLOGIC FORMATIONS DESCRIBED.

Aberdeen formation, British Columbia : Schofield, 1620.
 Abilene conglomerate, Permian, Kansas : Snider, 1736.
 Abitibi group, pre-Cambrian, Quebec : Mailholt, 1202 ; Tanton, 1813.
 Abitibi volcanics, pre-Cambrian, Quebec : Cooke, 401.
 Abitibi River limestone, Devonian, Canada : Savage and Van Tuyl, 1603.
 Abo beds, Pennsylvanian, New Mexico : B6se, 163.

Abo formation, Carboniferous, New Mexico : Baker, 55.
 Abo sandstone, Pennsylvanian, New Mexico : Semmes, 1659.
 Abo sandstone, Permian, New Mexico : Wells, 1978.
 Abrigo limestone, Cambrian, Arizona : Mitchell, 1322.
 Acla shales, Oligocene, Oregon : Harrison and Eaton, 761.
 Ackerman clays, Tertiary, Mississippi : Lowe, 1138.

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- Admire shale**, Pennsylvanian, Kansas: Snider, 1786.
- Admire shale member**, Pennsylvanian, Kansas: Moore, 1846.
- Aftonian interglacial stage**, Pleistocene: Baker, 56.
- Aftonian interglacial stage**, Pleistocene, Iowa: Arey, 35; Tilton, 1846.
- Aftonian stage**, Pleistocene, Iowa: Arey, 36; Tilton 1847.
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- Ainsworth formation**, Carboniferous or pre-Carboniferous, British Columbia: Schofield, 1617.
- Ainsworth formation**, Paleozoic, British Columbia: Schofield, 1619.
- Ainsworth series**, Paleozoic, British Columbia: Bancroft, 66; Schofield, 1619.
- Ajax limestone**, Ordovician, Utah: Lindgren and Loughlin, 1105; Wichman, 2024.
- Akron (dolomite) formation**, Silurian, New York and Ontario: Williams, 2084.
- Alachua clays**, Quaternary, Florida: Hay, 767.
- Alachua formation**, Tertiary, Florida: Sellards, 1648.
- Alamito terrane**, Pennsylvanian, New Mexico: Keyes, 998.
- Albany formation**, Permian, Texas: Matteson, 1231.
- Albright limestone**, Pennsylvanian, Maryland: Swartz, 1804.
- Albuquerquean series**, Proterozoic, New Mexico: Keyes, 993.
- Alger formation**, Silurian, Kentucky: Miller, 1293.
- Algoman**, pre-Cambrian, Ontario: Miller and Knight, 1801, 1802.
- Algoman series**, pre-Cambrian, New York: Ailing, 28.
- Allbates dolomite**, Permian, Texas: Gould, 678.
- Allegheny formation**, Pennsylvanian, Maryland: Swartz, 1804.
- Allegheny formation**, Pennsylvanian, Ohio: Stout, 1794.
- Allegheny series**, Pennsylvanian, Kentucky: Miller, 1293.
- Allegheny series**, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Allensville**, Mississippian, Ohio: Miller, 1293.
- Allison formation**, Cretaceous, Alberta: Rose, 1576.
- Almson formation**, Jurassic, Alberta: Rose, 1575.
- Alsen cherty limestones**, Devonian, New York: Grabau, 685.
- Altamaha (Lafayette?) formation**, Tertiary, Georgia: McCallie, 1159.
- Altamont limestone**, Pennsylvanian, Kansas and Oklahoma: Snider, 1786.
- Altamont limestone member**, Pennsylvanian, Kansas: Moore, 1846.
- Alto formation**, Devonian, Illinois: Savage, 1604, 1605.
- Alum Bluff formation**, Miocene, Florida: Sellards, 1647, 1648.
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- Americus limestone member**, Pennsylvanian, Kansas: Moore, 1846.
- Ames limestone**, Pennsylvanian, Maryland: Swartz, 1804.
- Ames limestone**, Pennsylvanian, Ohio: Stout, 1794.
- Amisk series**, pre-Cambrian, Manitoba: Bruce, 208.
- Amisk volcanics**, pre-Cambrian, Manitoba: Hanson, 744.
- Amsden formation**, Carboniferous, Wyoming: Collier, 889.
- Anacacho limestone**, Cretaceous, Texas: Udden, 1880.
- Andrews schist**, Cambrian, Georgia: McCallie, 1159.
- Angola shale**, Devonian, New York: Husakof and Bryant, 884.
- Anian period**, Proterozoic, New Mexico: Keyes, 998.
- Animikean**, pre-Cambrian, Ontario: Miller and Knight, 1801, 1802.
- Antietam sandstone**, Cambrian, Maryland: Bassler, 90.
- Antonio terrane**, Proterozoic, New Mexico: Keyes, 993.
- Antonito terrane**, Permian, New Mexico: Keyes, 998.
- Anvil member**, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Aplshapa shale**, Cretaceous, New Mexico: Garrett, 640.
- Apishapa terrane**, Cretaceous, New Mexico: Keyes, 993.
- Apison shale**, Cambrian, Georgia: McCallie, 1159.
- Aquidneck shales**, Carboniferous, Rhode Island: Perkins, 1462.
- Arago formation**, Eocene, Oregon: Smith and Packard, 1728.
- Arapahoe beds**, Cretaceous, Colorado: Henderson, 795.
- Arapahoe period**, Cenozoic (Tertiary), New Mexico: Keyes, 993.
- Arbuckle limestone**, Cambrian and Ordovician, Oklahoma: Decker, 483.
- Archuleta terrane**, Eocene, New Mexico: Keyes, 998.
- Arctomys formation**, Cambrian, Alberta: Walcott, 1928.
- Arecibo formation**, Oligocene, Porto Rico: Hodge, 837.

- Arecibo formation, Tertiary, Porto Rico: Berkey, 124; Hubbard, 877; Maury, 1248; Semmes, 1855.
- Arikaree formation, Miocene, South Dakota: O'Harra, 1889.
- Arkadelphia clay, Cretaceous, Arkansas: Miser, 1819.
- Arkansas novaculite, Devonian, Arkansas: Miser, 1819.
- Armendaris terrane, Ordovician, New Mexico: Keyes, 998.
- Armuchee chert, Devonian, Georgia: McCallie, 1159.
- Arnheim, Ordovician, Kentucky: Miller, 1298.
- Arnheim limestone, Ordovician, Tennessee: Butts, 258.
- Arriban series, Miocene, New Mexico: Keyes, 998.
- Ashokan formation, Devonian, New York: Grabau, 685.
- Aspen shale, Cretaceous, Wyoming: Schultz, 1689.
- Astoria shales, Oligocene, Oregon: Harrison and Eaton, 761.
- Athabaska series, pre-Cambrian (?), Canada: Alcock, 14.
- Atchison group, Carboniferous, Iowa: Smith, 1714.
- Atoka formation, Pennsylvanian, Arkansas: Miser, 1819.
- Atoka formation, Pennsylvanian, Oklahoma: Bloesch, 155; Snider, 1736.
- Attawapiskat coral reef, Silurian, Canada: Savage and Van Tuyl, 1608.
- Attleboro sandstones, Carboniferous, Rhode Island: Perkins, 1462.
- Austin chalk, Cretaceous, Texas: Dumble, 524; Snider, 1736; Udden, 1880.
- Austin chalk formation, Cretaceous, Texas: Shuler, 1696.
- Austin formation, Cretaceous, Texas: Sellards, 1650, 1653.
- Austin ("Annona") chalk, Cretaceous, Arkansas: Miser, 1819.
- Aux Vases sandstone, Mississippian, Illinois: Weller, 1074.
- Aux Vases sandstone, Mississippian, Missouri: Dake, 441.
- Avant limestone, Carboniferous, Oklahoma: Goldman, 666; Hopkins and Powers, 854.
- Avant limestone, Pennsylvanian, Oklahoma: Ross, 1578.
- Avondale volcanics, pre-Cambrian, Newfoundland: Buddington, 226.
- Aztecan series, Eocene, New Mexico: Keyes, 998.
- Backbone limestone, Devonian, Illinois: Savage, 1605.
- "Back-bone" limestone, Devonian, Illinois: Savage, 1604.
- Bad River cherty dolomite, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Bailey limestone, Devonian, Illinois: Savage, 1604, 1605.
- Bailey limestone, Devonian, Missouri: Dake, 441.
- Baitoa formation, Miocene, Dominican Republic: Cooke, 400.
- Baltimore gneiss, pre-Cambrian, Maryland: Pennsylvania, and Delaware: Bascom and Miller, 86.
- Bandera shale, Pennsylvanian, Kansas, and Oklahoma: Snider, 1736.
- Bandera shale member, Pennsylvanian, Kansas: Moore, 1346.
- Banff (Upper) formation, Triassic, Alberta: Rose, 1576.
- Bangor limestone, Carboniferous, Georgia: McCallie, 1159.
- Bar Harbor series, Mount Desert Island, Maine: Bascom, 87.
- Barnes conglomerate, Cambrian, Arizona: Ransome, 1507.
- Barranquitas-Cayey series, Comanchean, Porto Rico: Hodge, 887.
- Barstow formation, Tertiary, California: Merriam, 1264.
- Bartlesville sand, Pennsylvanian, Kansas: Boughton, 170; Moore, 1346.
- Bartlett Island series, Mount Desert Island, Maine: Bascom, 87.
- "Barton Beds," Silurian, Ontario: Williams, 2034.
- Bashi formation, Tertiary, Alabama: Brantley, 191.
- Bas Obispo formation, Eocene (?), Canal Zone: MacDonald, 1170.
- Bas Island series, Silurian, Ontario: Williams, 2034.
- Batesville sandstone, Mississippian, Arkansas: Miser, 1319, 1320.
- Baxter shale, Cretaceous, Wyoming: Schultz, 1689.
- Beale diorite, Jurassic (?), British Columbia: Dolmage, 506.
- Bear Branch member, Devonian, Tennessee: Dunbar, 525.
- Bearpaw formation, Cretaceous, Alberta: Allan, 20; Slipper, 1712; Stewart, 1766.
- Bearpaw shale, Cretaceous, Montana: Bowen, 171; Hancock, 734.
- Bear Pond schist, pre-Cambrian, New York: Alling, 28.
- Beaumont clays, Pleistocene, Texas: Dumble, 524.
- Beaumont formation, Quaternary, Texas: Hay, 767.
- Beauvais sandstone, Devonian, Missouri: Dake, 441.
- Beaver Bend limestone, Mississippian, Indiana: Malott, 1205; Malott and Thompson, 1206.
- Becher conglomerate, Cretaceous (?), Idaho: Mansfield, 1216.
- Beckwith formation, Jurassic, Wyoming: Schultz, 1689.
- Becraft limestone, Devonian, New York: Jones, 951.
- Bedford clay, Pennsylvanian, Ohio: Stout, 1794.

- Bedford shale, Mississippian, Kentucky : Miller, 1298.
- Bedford shale, Mississippian, Ohio : Decker, 488.
- Beech Creek limestone, Mississippian, Indiana : Malott, 1205 ; Malott and Thompson, 1206.
- Beech Mountain paramphibolite, pre-Cambrian, New York : Alling, 28.
- Beechwood member, Devonian, Kentucky : Miller, 1298.
- Beekmantown limestone, Ordovician, Maryland : Bassler, 90.
- Beekmantown limestone, Ordovician, New York : Decker, 483.
- Beekmantown (Ogdensburg) dolomite, Ordovician, New York : Chadwick, 810.
- Bella terrane, Devonian, New Mexico : Keyes, 993.
- Bellaire sandstone, Pennsylvanian, Ohio : Stout, 1794.
- Bellevue, Ordovician, Kentucky : Miller, 1298.
- Bell Mountain sandstone member, Cretaceous, New Mexico : Winchester, 2061.
- Belly River formation, Cretaceous, Alberta : Stewart, 1766.
- Belly River series, Cretaceous, Alberta : Slipper, 1712.
- Belt series, Algonkian, Idaho : Jones, 944.
- Bend formation, Carboniferous, Texas : Girty, 659.
- Bend formation, Pennsylvanian, Texas : Udden, 1880.
- Bend series, Carboniferous, Texas : Girty and Moore, 660 ; Udden, 1887.
- Bend series, Pennsylvanian, Texas : Mattoon, 1231 ; Moore, 1344 ; Plummer, 1475.
- Bend (Lower) shale, Carboniferous, Texas : Udden, 1887.
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- Bend (Lower) shale, Pennsylvanian, Texas : Moore, 1344 ; Plummer, 1475.
- Bennett formation, pre-Cambrian, Quebec : Knox, 1030.
- Benson bed, Ordovician, Kentucky : Miller, 1298.
- Benton formation, Cretaceous, Alberta : Rose, 1576 ; Stewart, 1766.
- Benton formation, Cretaceous, Colorado : Henderson, 795.
- Benton formation, Cretaceous, Kansas : Moore, 1346 ; Snider, 1736.
- Benton shale, Cretaceous, North Dakota : Leonard, 1062.
- Benwood limestone, Pennsylvanian, Ohio : Stout, 1794.
- Bernalillian series, Permian, New Mexico : Keyes, 993.
- Berea grit, Carboniferous, Kentucky : Jillson, 918.
- Berea sandstone, Mississippian, Kentucky : Miller, 1298.
- Berenda terrane, Devonian, New Mexico : Keyes, 993.
- Berne conglomerate, Mississippian, Ohio : Miller, 1298.
- Bertie waterlime formation, Silurian, Ontario : Williams, 2034.
- Bertram beds, Devonian, Iowa : Norton, 1881.
- Berwick gneiss, Carboniferous (?), Maine and New Hampshire : Wandke, 1948.
- Bethany Falls limestone, Pennsylvanian, Kansas : Snider, 1736.
- Bethany Falls limestone (Earlham), Pennsylvanian, Iowa : Tilton, 1846.
- Bethany Falls limestone member, Pennsylvanian, Kansas : Moore, 1346.
- Bethel sandstone, Mississippian, Illinois : Weller, 1974 ; Weller *et al.*, 1973.
- Bethel, Mississippian, Kentucky : Miller, 1298.
- Big Basin sandstone, Permian, Kansas : Snider, 1736.
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- Big Bend gravels, Pleistocene, Pennsylvania : Williams, 2032.
- Big Blue group, Permian, Kansas : Moore, 1346 ; Snider, 1736.
- Bigby substage, Ordovician, Kentucky : Miller, 1293.
- Bigby formation, Ordovician, Tennessee : Galloway, 633.
- Bigfork chert, Ordovician, Arkansas : Miser, 1319.
- Bigheart sandstone, Carboniferous, Oklahoma : Hopkins and Powers, 854.
- Bigheart sandstone, Pennsylvanian, Oklahoma : Goldman and Robinson, 667.
- Bighorn dolomite, Ordovician, Wyoming : Collier, 389.
- Big Spruce Knob sandstone, Mississippian : West Virginia : Reger, 1528.
- Big Spruce Knob shale, Mississippian, West Virginia : Reger, 1528.
- Bingen formation, Cretaceous, Arkansas : Miser, 1319.
- Birch Creek limestone, Carboniferous, Oklahoma : Hopkins and Powers, 854.
- Birch Creek schist, pre-Ordovician, Alaska : Capps, 291.
- Birch Lake sandstone, Cretaceous, Alberta : Slipper, 1712.
- Bird Creek limestone, Pennsylvanian, Oklahoma : Bowen *et al.*, 172 ; Heald, 779 ; Heald and Mather, 780.
- Birdsong formation, Devonian, Tennessee : Dunbar, 525.
- Birmingham shale, Pennsylvanian, Ohio : Stout, 1794.
- Bisher member of the West Union formation, Silurian, Ohio : Foerste, 598, 599.
- Bishop conglomerate, Tertiary or Quaternary, Wyoming : Schultz, 1639.
- Biwabik formation, pre-Cambrian, Minnesota : Broderick, 197, 198 ; Grout and Broderick, 716.
- Blackhand conglomerate, Mississippian, Kentucky : Miller, 1298.

248 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1919-1920.

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- Black River limestone, Ordovician, New York: Clark, 345.
- Blacksmith formation, Cambrian, Idaho: Mansfield, 1211.
- Blair formation, Cretaceous, Wyoming: Schultz, 1639.
- Blairmore formation, Cretaceous, Alberta: Rose, 1575, 1576; Shipper, 1712; Stewart, 1766.
- Blakely sandstone, Ordovician, Arkansas: Miser, 1319.
- Blaylock sandstone, Silurian, Arkansas: Miser, 1319.
- Bloomfield limestone, Pennsylvanian, Ohio: Stout, 1794.
- Bloomington formation, Cambrian, Idaho: Mansfield, 1211.
- Bloyd shale, Pennsylvanian, Arkansas: Miser, 1319.
- Bluebell dolomite, Ordovician, Utah: Lindgren and Loughlin, 1105.
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- Bluefield shale, Mississippian, Virginia: Harnsberger, 749.
- Bluestone formation, Mississippian, Virginia: Harnsberger, 749.
- Boggy formation, Pennsylvanian, Oklahoma: Bloesch, 155.
- Boggy shale, Pennsylvanian, Oklahoma: Snider, 1736.
- Boggs member, Pennsylvanian, Ohio: Stout, 1794.
- Bohio conglomerate, Oligocene, Panama Canal Zone: MacDonald, 1170; MacDonald *et al.*, 1171; Vaughan, 1910.
- Bois d'Arc limestone, Devonian, Oklahoma: Decker, 483.
- Bolin Creek member, Cambrian, Missouri: Dake, 441.
- Bollivar fire clay, Pennsylvanian, West Virginia: Reger, 1528.
- Bonaventure conglomerate, Devonian, Quebec: Clarke, 356.
- Bone Valley, Pliocene, Florida: Sellards, 1647.
- Bone Valley formation, Tertiary, Florida: Sellards, 1648.
- Bonneterre formation, Cambrian, Missouri: Dake, 441.
- Boone chert, Mississippian, Arkansas: Miser, 1320.
- Boone formation, Carboniferous, Oklahoma: Berger, 123.
- Boone formation, Mississippian, Arkansas: Miser, 1319.
- Boone formation, Mississippian, Oklahoma: Berger, 123; Snider, 1736.
- Brandon lignite, Tertiary, Vermont: Ben 133.
- Brannon bed, Ordovician, Kentucky: Miller, 1293.
- Brandy Run sandstone, Mississippian, Indiana: Malott, 1205; Malott and Thompson, 1206.
- Brdandywine formation, Cretaceous, Maryland and Delaware: Bascom and Miller, 86.
- Brassfield formation, Silurian, Ohio: Foerste, 598.
- Brassfield limestone, Silurian, Arkansas: Miser, 1319, 1320.
- Brassfield stage, Silurian, Kentucky: Miller, 1293.
- Brasstown schist, Cambrian, Georgia: McCallie, 1159.
- Braser limestone, Mississippian, Idaho: Mansfield, 1211, 1216.
- Brasos sandstone, Pennsylvanian, Texas: Plummer, 1475.
- Breckenridge formation, Pennsylvanian, Texas: Plummer, 1475.
- Breckenridge limestone, Pennsylvanian, Texas: Snider, 1736.
- Brentwood limestone member, Pennsylvanian, Arkansas: Miser, 1319.
- Bridgeburg horizon, Silurian, New York: Williams, 2034.
- Bridger formation, Tertiary, Wyoming: Schultz, 1639.
- Brier slate, pre-Cambrian, Michigan: Allen, 25.
- Brigham formation, Cambrian, Idaho: Mansfield, 1211.
- Britannia formation, Devonian-Carboniferous (?), British Columbia: Schofield, 1616.
- Broadback series, pre-Cambrian, Quebec: Cooke, 401.
- Brock series, pre-Cambrian, Quebec: Cooke, 401.
- Brookline conglomerate member, Pennsylvanian, Carboniferous, Massachusetts: Sayles, 1606.
- Brookville clay, Pennsylvanian, Ohio: Stout, 1794.
- Brownstown marl, Cretaceous, Arkansas: Miser, 1319.
- Brownstone sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Brule formation, Oligocene, South Dakota: O'Harra, 1369.
- Brush Creek limestone, Pennsylvanian, Maryland: Swartz, 1804.
- Brush Creek limestone, Pennsylvanian, Ohio: Stout, 1794.

- k Point sandstone, Pennsylvanian, Oklahoma: Robinson and Mills, 1559.
 ks Bridge mixed beds, Ordovician, New York: Chadwick, 310.
 la formation, Cretaceous, Texas: Selards, 1653.
 da limestone, Cretaceous, Texas: Christner and Wheeler, 339; Dumble, 524; Snider, 1736; Udden, 1880.
 falo cement bed, Silurian, New York: Williams, 2034.
 falo sandstone, Pennsylvanian, Ohio: Stout, 1794.
 falo shales, Ordovician, Missouri: Foerste, 603.
 falo Wallow formation, Mississippian, Indiana: Malott and Thompson, 1206.
 falo Wallow, Mississippian, Kentucky: Miller, 1293.
 illa conglomerate, Miocene, Dominican Republic: Cooke, 400.
 illhead Mountain formation, Cretaceous, British Columbia: Stewart, 1767.
 inger formation, Pennsylvanian, Texas: Plummer, 1475.
 irgen sandstone, Ordovician, Oklahoma: Snider, 1736.
 igrass sand, Pennsylvanian, Kansas: Moore, 1346.
 irke formation, Algonkian, Idaho: Jones, 944.
 irlingame limestone member, Pennsylvanian, Kansas: Moore, 1346.
 irlington limestone, Mississippian, Illinois: Coryell, 410.
 irlingame limestone, Pennsylvanian, Kansas: Snider, 1736.
 irlington limestone (Osagian), Mississippian, Missouri: Branson, 190.
 irro terrane, Cambrian, New Mexico: Keyes, 993.
 orton formation, Pennsylvanian, Oklahoma: Snider, 1736.
 ver, Mississippian, Ohio: Miller, 1293.
 ram marl, Tertiary, Mississippi: Lowe, 1138.
 hot Head shale member, Silurian, Ontario: Williams, 2034.
 ache Creek series, Carboniferous, British Columbia: Reinecke, 1538.
 addell beds, Tertiary, Texas: Dumble, 524.
 almito formation, Oligocene, Canal Zone: MacDonald, 1170; Vaughan, 1910.
 alhoun shale, Pennsylvanian, Kansas: Snider, 1736.
 alhoun shale member, Pennsylvanian, Kansas: Moore, 1346.
 allaway limestone, Devonian, Missouri: Cambridge limestone, Pennsylvanian, Maryland: Swartz, 1804.
 Cambridge limestone, Pennsylvanian, Ohio: Stout, 1794.
 Cambridge slate member, Permo-Carboniferous, Massachusetts: Sayles, 1606.
 Camden chert, Devonian, Tennessee: Dunbar, 525.
 Camillus shale member, Silurian, Ontario: Williams, 2034.
 Campbell Creek limestone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
 Camp Nelson substage, Ordovician, Kentucky: Miller, 1293.
 Caney shale, Mississippian, Oklahoma: Decker, 483.
 Cannelton limestone, Pennsylvanian, West Virginia: Hennen, 797.
 Cannon limestone, Ordovician, Tennessee: Galloway, 683.
 Cannonball marine member, Cretaceous or Tertiary, North Dakota: Leonard, 1082.
 Cannonball marine member of Lance formation, Tertiary (?), North and South Dakota: Stanton, 1756.
 Canton terrace, Tertiary, Mississippi: Lowe, 1138.
 Cantwell formation, Tertiary, Alaska: Capps, 291, 294.
 Canyon division, Pennsylvanian, Texas: Plummer, 1475.
 Canyon formation, Pennsylvanian, Texas: Matteson, 1231; Snider, 1736.
 Canyon Large terrane, Oligocene, New Mexico: Keyes, 993.
 Capitan limestone, Permian, New Mexico: Baker, 55.
 Capitan terrane, Permian, New Mexico: Keyes, 993.
 Cape May formation, Quaternary, New Jersey: Hay, 767.
 Cap Mountain formation, Cambrian, Texas: Snider, 1736.
 Capping quartzite, Cambrian, Arizona: Mitchell, 1322.
 Carbondale formation, Carboniferous, Illinois: Cady, 267, 268.
 Carbondale formation, Pennsylvanian, Illinois: Coryell, 410; Hinds, 841; Nebel, 1367.
 Carlin formation, Ordovician, Pennsylvanian: Field, 590.
 Carlile shale, Cretaceous, Kansas: Snider, 1736.
 Carlile shale, Cretaceous, New Mexico: Garrett, 640.
 Carlile shale, Cretaceous, South Dakota:

- Carrizo formation, Eocene, Texas: Sellards, 1653; Snider, 1736.
- Carrizo formation, Tertiary, Texas: Dumble, 524.
- Cartersville formation, Cambrian, Georgia: Hull, 880; Hull *et al.*, 878; McCallie, 1159.
- Carters limestone, Ordovician, Tennessee: Galloway, 633.
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- Cason shale, Ordovician, Arkansas: Miser, 1219, 1220.
- Cassville plant shale, Permian, Ohio: Stout, 1794.
- Cassville shale, Permian, Ohio: Stauffer and Schroyer, 1757.
- Castlegate sandstone, Cretaceous, Utah: Forrester, 610.
- Catahoula formation, Tertiary, Texas: Dumble, 524.
- Catahoula sandstone, Tertiary, Alabama: Brantley, 191.
- Catahoula sandstone, Tertiary, Mississippi: Lowe, 1138.
- Catahoula sandstone, Tertiary, Texas: Udden, 1880.
- Catamount schist, pre-Cambrian, New York: Alling, 28.
- Cathedral Bluffs member, Tertiary, Wyoming: Schultz, 1639.
- Cattaraugus formation, Devonian, New York and Pennsylvania: Decker, 483.
- Cave Creek formation, Permian, Kansas: Moore, 1346; Snider, 1736.
- Cayugan group, Silurian, Ontario: Williams, 2034.
- Cedar (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Cedar Creek argillite, Paleozoic, Washington: Weaver, 1970.
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- Cedar Rapids phase of Otis limestone, Devonian, Iowa: Norton, 1881.
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- Center Hall formation, Ordovician, Pennsylvania: Field, 590.
- Cerrado formation, Miocene, Dominican Republic: Cooke, 400; Maury, 1249.
- Cerro Gordo substage, Devonian, Iowa: Fenton, 580.
- Cevicos limestone, Oligocene, Dominican Republic: Cooke, 400.
- Chaco terrane, Oligocene, New Mexico: Keyes, 993.
- Chacra terrane, Cretaceous, New Mexico: Keyes, 993.
- Chadron formation, Oligocene, South Dakota: Darton, 461; O'Harra, 1389.
- Chagres sandstone, Pliocene, Canal Zone: MacDonald, 1170.
- Chagrin formation, Ohio: Decker, 483.
- Chaman series, Oligocene, New Mexico: Keyes, 993.
- Chambersburg limestone, Ordovician, Maryland: Bassler, 90.
- Chamiso formation, Cretaceous, New Mexico: Winchester, 2061.
- Champion shell bed, Cretaceous, Kansas: Twenhofel, 1871.
- Chanute shale, Pennsylvanian, Iowa: Tilton, 1846.
- Chanute shale, Pennsylvanian, Kansas: Snider, 1736.
- Chanute shale member, Pennsylvanian, Kansas: Moore, 1306.
- Chaquaqua terrane, Jurassic, New Mexico: Keyes, 993.
- Charlton formation, Tertiary, Georgia: McCallie, 1159.
- Chase formation, Permian, Kansas: Moore, 1346; Snider, 1736.
- Chattahoochee formation, Oligocene, Florida: Sellards, 1647.
- Chattahoochee formation, Tertiary, Florida: Sellards, 1648.
- Chattanooga black shale, Devonian, Georgia: McCallie, 1159.
- Chattanooga formation, Mississippian, Tennessee: Galloway, 633.
- Chattanooga shale, Devonian, Arkansas: Miser, 1819, 1320.
- Chattanooga shale, Devonian, Illinois: Weller, *et al.*, 1973.
- Chattanooga shale, Devonian, Kentucky: Butts, 259; Jilison, 918.
- Chattanooga shale, Devonian, Oklahoma: Snider, 1736.
- Chattanooga shale, Devonian, Tennessee: Butts, 258; Dunbar, 525.
- Chattanooga shale, Devonian and Mississippian, Kentucky: Miller, 1297.
- Chattanooga shale, Devonian or Carboniferous, Tennessee: Mather, 1227.
- Chattanooga shale, Devonian or Carboniferous, Kentucky: Shaw and Mather, 1680.
- Chautauquan group, Devonian, Tennessee: Dunbar, 525.
- Chaves terrane, Permian, New Mexico: Keyes, 993.
- Checkerboard limestone, Pennsylvanian, Oklahoma: Bloesch, 155.
- Cheggoggin Point formation, Nova Scotia: Fairbault, 572.
- Chemung formation, Pennsylvania: Decker, 483.
- Cherokee shale, Carboniferous, Oklahoma: Berger, 123.
- Cherokee shale, Pennsylvanian, Kansas: Boughton, 170; Moore, 1346.
- Cherokee shale, Pennsylvanian, Kansas and Oklahoma: Snider, 1736.

- Cherokee shale, Pennsylvanian, Oklahoma : Berger, 123.
 Cherryvale shale, Pennsylvanian, Iowa : Hilton, 1846.
 Cherryvale shale, Pennsylvanian, Kansas : Snider, 1736.
 Cherryvale shale member, Pennsylvanian, Kansas : Moore, 1346.
 Cheshewalla sandstone, Carboniferous, Oklahoma : Goldman, 665.
 Cheshewalla sandstone, Pennsylvanian, Oklahoma : Goldman and Robinson, 667 ; Robinson and Mills, 1559, 1560.
 Chester group, Mississippian, Illinois : Weller *et al.*, 1973 ; Weller, 1974, 1975.
 Chester series, Mississippian, Kentucky : Miller, 1293.
 Chesterfield limestone, pre-Cambrian, New York : Alling, 28.
 Chewelah argillite, Paleozoic, Washington : Weaver, 1970.
 Cheyenne sandstone, Comanchean, Kansas : Snider, 1736 ; Moore, 1346 ; Twenhofel, 1871.
 Chickamauga formation, Ordovician, Georgia : McCallie, 1159.
 Chico formation, Cretaceous, California : Ellis, 542 ; Kew, 979.
 Chico group, Cretaceous, Oregon : Smith and Parkard, 1728.
 Chilton (Lower) sandstone, West Virginia : Reger, 1528.
 Chilton (Upper) sandstone, Pennsylvanian, West Virginia : Hennen, 797 ; Reger, 1528.
 Chimneyhill limestone, Silurian, Oklahoma : Decker, 483.
 Chinle formation, Triassic, Arizona : Shimer, 1693.
 Chinle formation, Triassic, Utah : Clark, 344.
 Chipola marl, Miocene, Gulf States : Vaughan, 1910.
 Chiricahuan series, Cambrian, New Mexico : Keyes, 993.
 Chisna formation, Carboniferous, Alaska : Chapin, 330.
 Chittistone limestone, Triassic, Alaska : Bateman and McLaughlin, 98.
 Chloridan series, Cambrian, New Mexico : Keyes, 993.
 Choctawhatchee formation, Miocene, Florida : Sellards, 1647.
 Choctawhatchee formation, Tertiary, Florida : Sellards, 1648.
 Choctawhatchee marl, Miocene, Florida : Vaughan, 1910.
 Choptank formation, Miocene, Atlantic Coastal Plain : Vaughan, 1910.
 Chouteau limestone (Kinderhookian), Mississippian, Missouri : Branson, 190.
 Choza formation, Permian, Texas : Reede, 109.
 Christiansia bed, Ordovician, Maryland : Bassler, 90.
 Chungwater formation, Triassic, Wyoming : Collier, 387, 389.
 Chupadera formation, Permian, New Mexico : Wells, 1978.
 Cibao limestone, Tertiary, Porto Rico : Hubbard, 927.
 Cibola terrane, Silurian, New Mexico : Keyes, 993.
 Cimarron group, Carboniferous, Kansas : Darton, 462.
 Cimarron group, Permian, Kansas : Moore, 1346 ; Snider, 1736.
 Cimarronian series, Permian, New Mexico : Keyes, 993.
 Cincinnati, Ordovician, Indiana : Logan, 1120.
 Cisco formation, Pennsylvanian, Texas : Matteson, 1131 ; Snider, 1736.
 Cisco division, Pennsylvanian, Texas : Plummer, 1475.
 Citronelle formation, Tertiary, Mississippi : Lowe, 1097, 1140.
 Claggett formation, Cretaceous, Montana : Bowen, 171 ; Hancock, 734.
 Claiborne formation, Eocene, Florida : Sellards, 1647.
 Claiborne formation, Tertiary, Florida : Sellards, 1648.
 Claiborne formation, Tertiary, Mississippi : Lowe, 1140.
 Claiborne group, Eocene, Texas : Snider, 1736.
 Claiborne group, Tertiary, Alabama : Brantley, 191.
 Claiborne group, Tertiary, Mississippi : Lowe, 1138.
 Claiborne group, Tertiary, Texas : Dumble, 524.
 Clarendon gravels, Pleistocene, Pennsylvania : Williams, 2032.
 Clarion sandstone, Pennsylvanian, Ohio : Stout, 1794.
 Clarksburg limestone, Pennsylvanian, Ohio : Stout, 1794.
 Clarno formation, Eocene, Oregon : Smith and Packard, 1728.
 Clarysville sandstone, Pennsylvanian, Maryland : Swartz, 1804.
 Clayton formation, Tertiary, Alabama : Brantley, 191.
 Clayton formation, Tertiary, Mississippi : Lowe, 1138.
 Clear Creek chert, Devonian, Illinois : Savage, 1604, 1605.
 Clear Fork formation, Permian, Texas : Matteson, 1231.
 Clearwater formation, Cretaceous, Alberta : McLearn, 1188.
 Clem Creek sandstone, Carboniferous, Oklahoma : Hopkins and Powers, 854.
 Clem Creek sandstone, Pennsylvanian, Oklahoma : Ross, 1578.
 Cleveland shale, Devonian, Ohio : Decker, 483.
 Cliff House sandstone, Cretaceous, Colorado : Collier, 386.
 Clifty limestone, Devonian, Arkansas : Miser, 1319.

- Clinton formation, Silurian, Ontario: Williams, 2084.
- Clore, Mississippian, Kentucky: Miller, 1298.
- Clore limestone, Mississippian, Illinois: Weller, 1974; Weller et al, 1973.
- Cloverly formation, Cretaceous, Wyoming: Collier, 389.
- Cloverly formation, Cretaceous, Wyoming: Hancock, 734.
- Clugston limestone, Paleozoic, Washington: Weaver, 1970.
- Coaledo formation, Eocene, Oregon: Harrison and Eaton, 761; Smith and Packard, 1728.
- Coalburg (Lower) sandstone, Pennsylvania, West Virginia: Hennen, 797.
- Coalburg (Upper) sandstone, Pennsylvania, West Virginia: Hennen, 797; Reger, 1528.
- Coamo tuff limestone, Porto Rico; Berkey, 124.
- Coamo Springs limestone series, Eocene, Porto Rico: Hodge, 887.
- Coast Range batholith, Jurassic (?), British Columbia: Dolmage, 506.
- Cobalt series, pre-Cambrian, Ontario: Cooke, 401, 407; Coleman, 382; Whitehead, 2010.
- Cobalt series, pre-Cambrian, Quebec: Cooke, 403.
- Cobleskill limestone, Silurian, New York: Jones, 951.
- Coburn formation, Ordovician, Pennsylvania: Field, 590.
- Cockfield beds, Tertiary, Mississippi: Lowe, 1138.
- Coconino sandstone, Permian, Arizona: Shimer, 1693.
- Cody shale, Cretaceous, Wyoming: Collier, 389.
- Coeymans limestone, Devonian, New York: Jones, 951.
- Coffee sand member, Cretaceous, Tennessee: Wade, 1922.
- Coffee Mill Hammock marl, Quaternary, Florida: Sellards, 1646.
- Coffeyville limestone, Pennsylvanian, Kansas and Oklahoma: Snider, 1736.
- Coggon phase of Otis limestone, Devonian, Iowa: Norton, 1381.
- Cohansey sands, Quaternary, New Jersey: Hay, 767.
- Coldwater group, Cretaceous, British Columbia: Reinecke, 1538.
- Cole Canyon dolomite, Cambrian, Utah: Lindgren and Loughlin, 1105.
- Collazo shales, Tertiary, Porto Rico: Maury, 1248.
- Collier shale, Cambrian, Arkansas: Miser, 1319.
- Colorado formation, Cretaceous, Alberta: Slipper, 1712.
- Colorado group, Cretaceous, Alberta: McLearn, 1187.
- Colorado group, Cretaceous, Colorado: Henderson, 795.
- Colorado shale, Cretaceous, Montana: Bowen, 171; Hancock, 734.
- Columbia formation, Pleistocene, Tennessee: Schroeder, 1623.
- Columbia formation, Pleistocene, Texas: Dumble, 524; Snider, 1736.
- Columbia group, Quaternary, Maryland and Delaware: Bascom and Miller, 86.
- Columbia lava, Neocene, Oregon: Smith and Packard, 1728.
- Columbia substage, Quaternary, Kentucky: Miller, 1293.
- Columbus limestone, Devonian, Kentucky: Miller, 1293.
- Colville quartzite, Paleozoic, Washington: Weaver, 1970.
- Colville series, Tertiary, Alaska: Dall, 451.
- Comanchean system, Kansas: Moore, 1346.
- Comanche formation, Cretaceous, Colorado: Henderson, 795.
- Comanche series, Cretaceous, Kansas: Darton, 462.
- Comanche Peak beds, Cretaceous, Texas: Dumble, 524.
- Comanche Peak formation, Cretaceous, Texas: Sellards, 1653.
- Comanche Peak limestone, Comanchean, Texas: Liddle and Prettyman, 1102; Snider, 1736.
- Comanche Peak limestone, Cretaceous, Texas: Matteson, 1281; Snider, 1736; Winton and Adkins, 2062.
- Commerce sandstone, Tertiary (?), Missouri: Dake, 441.
- Conasauga formation, Cambrian, Georgia: Hull, 880; Hull et al., 878; McCallie, 1159.
- Conception slate series, pre-Cambrian, Newfoundland: Buddington, 226.
- Conemaugh formation, Pennsylvanian, Maryland: Swartz, 1804.
- Conemaugh formation, Pennsylvanian, Ohio: Stout, 1794.
- Conemaugh series, Pennsylvanian, West Virginia: Reger, 1528.
- Conewango clay, Pleistocene, Pennsylvania: Williams, 2032.
- Connellsville sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Conococheague limestone, Cambrian, Maryland: Bassler, 90.
- Cook Mountain formation, Eocene, Texas: Snider, 1736.
- Cook Mountain formation, Tertiary, Texas: Udden, 1880.
- Cook's Mountain formation, Tertiary, Texas: Dumble, 524.
- Coon Creek member, Cretaceous, Tennessee: Wade, 1922.
- Cooper limestone, Devonian, Missouri: Branson, 190; Greger, 698.
- Coos conglomerates, Neocene, Oregon: Smith and Packard, 1728.
- Coos formation, Pliocene, Oregon: Harrison and Eaton, 761.

- Coppe group**, pre-Cambrian, Michigan: Allen, 26.
- Corbin granite**, Archean, Georgia: Hull *et al.*, 878.
- Corinth sandstone**, Pennsylvanian, Maryland: Swartz, 1804.
- Cornishville bed**, Ordovician, Kentucky: Miller, 1298.
- Corozal limestone**, Cretaceous (?), Porto Rico: Semmes, 1855.
- Corozal limestone**, Porto Rico: Berkey, 124.
- Corrigan formation**, Oligocene, Texas: Snider, 1736.
- Corrigan formation**, Tertiary, Texas: Dumble, 524.
- Corryville**, Ordovician, Kentucky: Miller, 1298.
- Cotter dolomite**, Ordovician, Arkansas: Miser, 1819.
- Cottonwood limestone**, Permian, Kansas, Oklahoma: Snider, 1736.
- Cottonwood limestone**, Permian, Oklahoma: Bowen *et al.*, 172.
- Cottonwood limestone member**, Permian, Kansas: Moore, 1846.
- Council Grove formation**, Permian, Kansas: Moore, 1846; Snider, 1736.
- Coventry conglomerate**, Ordovician, Vermont: Richardson, 1544.
- Coventry phase of Waits River limestone**: Richardson, 1544, 1545.
- Cow Run sandstone**, Pennsylvania, Ohio: Stout, 1794.
- Coyote terrane**, Pennsylvanian, New Mexico: Keyes, 998.
- Craghead Creek shale**, Devonian, Missouri: Greger, 697.
- Craigsville limestone**, Devonian, Virginia: Holden, 845.
- Cranberry Island series**, Mount Desert Island, Maine: Bascom, 87.
- Creston reds**, Permian, Ohio: Stauffer and Schroyer, 1757.
- Cristobal terrane**, Ordovician, New Mexico: Keyes, 952.
- Crouse limestone**, Permian, Oklahoma: Bowen *et al.*, 172; Snider, 1736.
- Crowsnest volcanics**, Cretaceous, Alberta: Rose, 1575, 1576.
- Cruise oil zone**, Tertiary, Trinidad: Maccready, 1196.
- Crystal Mountain sandstone**, Ordovician, Arkansas: Miser, 1819.
- Cucuracha formation**, Oligocene, Panama Canal Zone: MacDonald, 1170; MacDonald *et al.*, 1171; Vaughan, 1910.
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- Culebra formation**, Oligocene, Panama Canal Zone: MacDonald, 1170; Vaughan, 1910.
- Curdsville substage**, Ordovician, Kentucky: Miller, 1298.
- Curry member**, pre-Cambrian, Michigan: Allen, 26.
- Cutler formation**, Permian (?), Colorado: Coffin, 375.
- Cuyahoga stage**, Mississippian, Kentucky: Miller, 1298.
- Cynthiana stage**, Ordovician, Kentucky: Miller, 1298.
- Cypress sandstone**, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1978.
- Cypress sandstone**, Mississippian, Indiana: Malott, 1205; Malott and Thompson, 1206.
- Cypress sandstone**, Mississippian, Kentucky: Butts, 259; Miller, 1298.
- Cypress sandstone**, Mississippian, Tennessee: Butts, 258.
- Cyril gypsum bed**, Permian, Oklahoma: Clapp, 840.
- Dagmar limestone**, Cambrian, Utah: Lindgren and Loughlin, 1105; Wichman, 2624.
- "Dakota" formation**, Cretaceous, Colorado: Crawford *et al.*, 416; Henderson, 795; Perini and Collins, 1461.
- Dakota formation**, Cretaceous, Wyoming: Hancock, 737.
- Dakota group**, Cretaceous, Colorado: Lee, 1047.
- Dakota sandstone**, Cretaceous, Kansas: Darton, 462; Moore, 1846; Snider, 1736.
- Dakota sandstone**, Cretaceous, New Mexico: Baker, 55; Garrett, 640; Wells, 1978; Winchester, 2061.
- Dakota sandstone**, Cretaceous, North Dakota: Leonard, 1082.
- Dakota sandstone**, Cretaceous, Utah: Clark, 844.
- Dakota stage**, Cretaceous, Iowa: Tilton, 1847.
- Dakota (Lower)**, Cretaceous, Kansas: Twenhofel, 1871.
- Dakota (Upper)**, Cretaceous, Kansas: Twenhofel, 1871.
- "Dannemora" formation**, pre-Cambrian, New York: Ailing, 28.
- Datil formation**, Tertiary, New Mexico: Winchester, 2061.
- Davenport (Lower) limestone**, Devonian, Iowa: Norton, 1381.
- Davenport (Upper) limestone**, Devonian, Iowa: Norton, 1381.
- Day Creek dolomite**, Permian, Kansas: Snider, 1736.
- Day Creek dolomite member**, Permian, Kansas: Moore, 1346.
- Dayton limestone**, Silurian, Ohio: Foerste, 598.
- Deadman limestone**, Triassic (?), Idaho: Mansfield, 1211, 1214, 1216.
- Decatur limestone**, Silurian, Tennessee: Dunbar, 525.
- Decatur sand**, Tertiary, Mississippi: Lowe, 1138.
- Decaturville chert**, Devonian, Tennessee: Dunbar, 525.
- De Cew waterlime member**, Silurian, Ontario: Williams, 2084.
- Decorah shale**, Ordovician, Minnesota: Grout and Soper, 715.
- Decota sandstone**, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.

- Deer Creek limestone, Pennsylvanian, Kansas: Snider, 1736.
- Deer Creek limestone, Pennsylvanian, Oklahoma, Heald, 777; Heald and Mather, 780.
- Deer Creek limestone member, Pennsylvanian, Kansas: Moore, 1846.
- Deer Lake argillite, Paleozoic, Washington: Weaver, 1970.
- Deer Trail argillite, Paleozoic, Washington: Weaver, 1970.
- DeGonia sandstone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1978.
- De Kalb limestone (Drum), Pennsylvanian, Iowa: Tilton, 1846.
- Delaware limestone, Devonian, Kentucky: Miller, 1293.
- Delaware (Sellersburg) limestone, Devonian, Kentucky: Miller, 1299.
- Delaware Mountain formation, Permian, New Mexico: Baker, 56.
- Del Rio clay, Cretaceous, Texas: Christner and Wheeler, 389; Snider, 1736; Udden, 1880.
- Del Rio clays, Cretaceous, Texas: Dumble, 524.
- Del Rio formation, Cretaceous, Texas: Sellards, 1653.
- Denton formation, Comanchean, Texas: Adkins, 6; Adkins and Winton, 7.
- Denton marl, Cretaceous, Texas: Winton and Adkins, 2062.
- Denver beds, Cretaceous, Colorado: Henderson, 795.
- De Queen limestone member, Cretaceous, Arkansas: Miser, 1819.
- Des Moines group, Pennsylvanian, Kansas: Moore, 1846; Snider, 1736.
- Des Moines stage, Pennsylvanian, Iowa: Tilton, 1846.
- Devil's River limestone, Cretaceous, Texas: Christner and Wheeler, 389.
- Dewey limestone, Carboniferous, Oklahoma: Goldman, 666.
- Dewey limestone, Pennsylvanian, Oklahoma: Ross, 1578; Snider, 1736.
- Dewitt formation, Tertiary, Texas: Udden, 1880.
- Dexter sands, Cretaceous, Texas: Shaler, 1696.
- Dierks limestone lentil, Cretaceous, Arkansas: Miser, 1819.
- Dighton conglomerate, Carboniferous, Massachusetts and Rhode Island: Perkins, 1462.
- Dillard formation, Jurassic, Oregon: Smith and Packard, 1728.
- Dimple formation, Pennsylvanian, Texas: Böse, 161; Moore, 1844.
- Dingess limestone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Dinwoody formation, Carboniferous, Wyoming: Collier, 887.
- Dinwoody formation, Carboniferous and Triassic, Wyoming: Collier, 389.
- "Dixon" graphite schist, pre-Cambrian, New York: Ailing, 23.
- Dockum beds, Triassic, Texas: Liddle and Prettyman, 1102; Snider, 1736.
- Documan series, Triassic, New Mexico: Keyes, 993.
- Dog Creek shale, Permian, Kansas: Snider, 1736.
- Dog Creek shale member, Permian, Kansas: Moore, 1846.
- Dolores formation, Triassic, Colorado: Coffin, 875.
- Doloresian series, Triassic, New Mexico: Keyes, 993.
- Don beds, Pleistocene, Ontario: Baker, 56.
- Dorchester slate member, Permo-Carboniferous, Massachusetts: Sayles, 1606.
- Dotban formation, Jurassic, Oregon: Smith and Packard, 1728.
- Dotban limestone, Pennsylvanian, Texas: Plummer, 1475.
- Dotson sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Dotson, (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Double Mountain formation, Permian, Texas: Matteson, 1231.
- Douglas formation, Pennsylvanian, Kansas: Boughton, 170; Moore, 1846; Snider, 1736.
- Douglas shale, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Doyle shale, Permian, Kansas: Snider, 1736.
- Doyle shale member, Permian, Kansas: Moore, 1846.
- Dragoonian series, Cambrian, New Mexico: Keyes, 993.
- Draney limestone, Cretaceous (?), Idaho: Mansfield, 1216.
- Dresbach sandstone, Cambrian, Minnesota: Grout and Soper, 715.
- Dresbach formation, Cambrian, Wisconsin: Tweenhofel and Thwaites, 1870.
- Dresden paramphibolite, pre-Cambrian, New York: Ailing, 28.
- Dripping Spring quartzite, Cambrian, Arizona: Ransome, 1507.
- Drum limestone, Pennsylvanian, Kansas: Snider, 1736.
- Drum limestone member, Pennsylvanian, Kansas: Moore, 1846.
- Duck Creek formation, Comanchean, Texas: Adkins, 6; Snider, 1736.
- Duck Creek formation, Cretaceous, Texas: Adkins and Winton, 7; Winton and Adkins, 2062.
- Duluth gabbro, pre-Cambrian, Minnesota: Grout and Broderick, 716.
- Dunkard series, Permian, Ohio: Stauffer and Schroyer, 1757; Stout, 1794.
- Dunvegan formation, Cretaceous, Alberta: McLearn, 1197, 1198.
- Dunvegan formation, Cretaceous, British Columbia: Stewart, 1767.
- Duplin marl, Miocene, Atlantic Coastal Plain: Vaughan, 1910.

- Duplin marl**, Tertiary, Georgia: McCallie, 1159.
- Dutch Creek sandstone**, Devonian, Illinois: Savage, 1604, 1605.
- Dyer Bay dolomite lentil**, Silurian, Ontario: Williams, 2034.
- Eagle limestone and shale**, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Eagle sandstone**, Cretaceous, Montana: Bowen, 171; Hancock, 734.
- Eagle sandstone**, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Eagle Creek formation**, Tertiary, Oregon: Smith and Packard, 1728.
- Eagle Creek formation**, Tertiary, Washington and Oregon: Chaney, 325.
- Eagle Ford formation**, Cretaceous, Texas: Christner and Wheeler, 339; Dumble, 524; Sellards, 1653; Shuler, 1696; Snider 1736; Udden, 1880.
- Eagleford shales**, Cretaceous, Texas: Winton and Adkins, 2062.
- Eagle Mountain quartzite**, Paleozoic, Washington: Weaver, 1970.
- Early Bird formation**, Carboniferous or pre-Carboniferous, British Columbia: Schofield, 1617.
- Early Bird formation**, Paleozoic, British Columbia: Schofield, 1619.
- Eastland formation**, Pennsylvanian, Texas: Plummer, 1475.
- Eastland limestone**, Pennsylvanian, Texas: Snider, 1736.
- East Lynn sandstone**, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- East Lynn (Upper) sandstone**, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Eddy terrane**, Permian, New Mexico: Keyes, 993.
- Eden formation**, Ordovician, Kentucky: Miller, 1293.
- Edmonton formation**, Cretaceous, Alberta: Allan, 20; Slipper, 1712.
- Edwards formation**, Comanchean, Texas: Adkins, 6.
- Edwards formation**, Cretaceous, Texas: Sellards, 1653.
- Edwards limestone**, Comanchean, Texas: Liddle and Prettyman, 1102.
- Edwards limestone**, Cretaceous, Texas: Christner and Wheeler, 339; Dumble, 524; Snider, 1736; Udden, 1880; Winton and Adkins, 2062.
- Ekwan River limestone**, Silurian, Canada: Savage and Van Tuyl, 1603.
- Elbrook formation**, Cambrian, Maryland: Bassler, 90.
- Elgin sandstone**, Pennsylvanian, Kansas: Moore, 1346.
- Elgin sandstone**, Pennsylvanian, Oklahoma: Heald and Bowen, 778; Snider, 1736.
- Elliot phyllite**, Carboniferous (?), Maine and New Hampshire: Wandke, 1943.
- Elk River beds**, Pleistocene, Oregon: Smith and Packard, 1728.
- Ellenberger limestone**, Cambro-Ordovician, Texas: Snider, 1736.
- Ellenberger limestone formation**, Cambro-Ordovician, Texas: Matteson, 1231.
- Ellenburger formation**, Texas: Sellards, 1652, 1654.
- Ellenburger limestone**, Ordovician, Texas: Udden, 1880.
- Ellerslie sandstone**, Pennsylvanian, Maryland: Swarts, 1804.
- Elmdale shale**, Pennsylvanian, Kansas: Snider, 1736.
- Elmdale shale member**, Pennsylvanian, Kansas: Moore, 1346.
- Elm Grove limestone**, Permian, Ohio: Stauffer and Schroyer, 1757; Stout, 1794.
- El Pasan series**, Ordovician, New Mexico: Keyes, 993.
- El Paso limestone**, Ordovician, Texas: Udden, 1880.
- Elvins formation**, Cambrian, Missouri: Tarr, 1817.
- Elwren sandstone**, Mississippian, Indiana: Malott and Thompson, 1206.
- Elwren sandstone and shale**, Mississippian, Indiana: Malott, 1205.
- Embar group**, Carboniferous, Wyoming: Collier, 387.
- Embar group**, Carboniferous and Triassic, Wyoming: Collier, 389.
- Emerald dolomite member**, Ordovician, Utah: Lindgren and Loughlin, 1105.
- Emmitsburg facies of Newark system**, Triassic, Maryland: Dorsey, 510.
- Emperor limestone**, Oligocene, Panama Canal Zone: MacDonald, 1170; MacDonald *et al.*, 1171; Vaughan, 1910.
- Empire beds**, Oligocene, Oregon: Smith and Packard, 1728.
- Empire formation**, Pliocene, Oregon: Harrison and Eaton, 761.
- Emporia limestone**, Pennsylvanian, Kansas: Snider, 1736.
- Emporia shale member**, Pennsylvanian, Kansas: Moore, 1346.
- Engadine dolomite**, Michigan: Ehlers, 539.
- Enid formation**, Permian, Kansas: Moore, 1346; Snider, 1736.
- Enid formation**, Permian, Oklahoma: Clapp, 340.
- Enterprise green marl**, Tertiary, Mississippi: Lowe, 1138.
- Enterprise shale**, Permian, Kansas: Snider, 1736.
- Enterprise shale member**, Permian, Kansas: Moore, 1346.
- Ephraim conglomerate**, Cretaceous (?), Idaho: Mansfield, 1216.
- Eramosa member**, Silurian, Ontario: Williams, 2034.
- Erwin quartzite**, Cambrian, Virginia: Stose *et al.*, 1786.
- Escabrosa limestone**, Mississippian, Arizona: Mitchell, 1322.

- Escondido beds, Cretaceous, Texas: Udden, 1880.
- Esbridge shale, Pennsylvanian, Kansas: Snider, 1736.
- Esbridge shale member, Pennsylvanian, Kansas: Moore, 1346.
- Esopus grit, Devonian, New York: Jones, 951.
- Estill, Silurian, Kentucky: Miller, 1293.
- Etchegoin formation, Tertiary, California: Pack, 1415.
- Eutaw formation, Cretaceous, Alabama: Brantley, 191.
- Eutaw formation, Cretaceous, Georgia: McCallie, 1159.
- Eutaw formation, Cretaceous, Georgia, Alabama, and Tennessee: Berry, 129.
- Eutaw formation, Cretaceous, Mississippi: Lowe, 1138, 1140.
- Eutaw formation, Cretaceous, Tennessee: Wade, 1922.
- Everton formation, Ordovician, Missouri: Dake, 441.
- Everton limestone, Ordovician, Arkansas: Miser, 1319.
- Ewing limestone, Pennsylvanian, Ohio: Stout, 1794.
- Exter (?) formation, Triassic, New Mexico: Garrett, 640.
- Exter terrane, Jurassic, New Mexico: Keyes, 993.
- Fairmount, Ordovician, Kentucky: Miller, 1293.
- Fajardo shales, Porto Rico: Berkey, 124.
- Falkirk dolomite, Silurian, New York: Williams, 2034.
- Farnham formation, Ordovician, Quebec: Knox, 1030.
- Faulconer bed, Ordovician, Kentucky: Miller, 1293.
- Faxon limestone, pre-Cambrian, New York: Alling, 28.
- Fayette formation, Eocene, Texas: Snider, 1736.
- Fayette substage, Tertiary, Texas: Dumble, 524.
- Fayetteville shale, Mississippian, Arkansas: Miser, 1319.
- Fayetteville shale, Mississippian, Oklahoma: Snider, 1736.
- Fernando formation, Pliocene, California: Kew, 979, 980.
- Fernie formation, Jurassic, Alberta: Rose, 1575, 1576.
- Fernie formation, "Juratrias," Alberta: MacVicar, 1196.
- Fernvale limestone, Ordovician, Arkansas: Miser, 1319, 1320.
- Fernvale formation, Ordovician, Tennessee: Mather, 1227.
- Fernow rhyolite, Utah: Lindgren and Loughlin, 1105.
- Ferroh sandstone, Cretaceous, Utah: Clark, 344.
- Fletcher sand, Mississippian, Texas: Matteson, 1231.
- Fish Creek argillite, Paleozoic, Washington: Weaver, 1970.
- Fish Creek sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Fisher quartz lgite, Tertiary, Colorado: Patton, 1454.
- Fish Haven dolomite, Ordovician, Idaho: Mansfield, 1211.
- Fish House clays, Quaternary, New Jersey: Hay, 767.
- Flaming Gorge formation, Jurassic, Utah: Butler, 255.
- Fiat Gap Member, Devonian, Tennessee: Dunbar, 525.
- Flathead sandstone, Cambrian, Wyoming: Collier, 399.
- Flattop Mountain sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Flaxman formation, Pleistocene, Alaska: Leffingwell, 1074.
- Fleming clay, Tertiary, Texas: Udden, 1880.
- Fleming formation, Tertiary, Texas: Dumble, 524.
- Florence flint, Permian, Kansas: Snider, 1736.
- Florence flint member, Permian, Kansas: Moore, 1346.
- Florencia formation, Pleistocene: Baker, 56.
- Flowerpot shale, Permian, Kansas: Snider, 1736.
- Flowerpot shale member, Permian, Kansas: Moore, 1346.
- Floyd shale, Carboniferous, Georgia: McCallie, 1159.
- Folley limestone, Ordovician, Missouri: Foerste, 603.
- Foraker limestone, Pennsylvanian, Oklahoma: Bowen *et al.*, 172; Snider, 1736.
- Foraker limestone member, Carboniferous, Kansas and Oklahoma: Twenhofel, 1867.
- Forest Hill sand, Tertiary, Mississippi: Lowe, 1138.
- Forest Hill (Madison) sand, Tertiary, Mississippi: Lowe, 1188.
- Fort Hall formation, Triassic, Idaho: Mansfield, 1211, 1216.
- Fort Hays limestone member, Cretaceous, Kansas: Moore, 1346.
- Fort Payne chert, Mississippian, Kentucky: Miller, 1297; Shaw and Mather, 1680.
- Fort Payne chert, Mississippian, Tennessee: Mather, 1227.
- Fort Payne formation, Mississippian, Kentucky: Butts, 259.
- Fort Payne formation, Mississippian, Tennessee: Butts, 258; Galloway, 633.
- Fort Pierre group, Cretaceous, Colorado: Henderson, 794.
- Fort Riley limestone, Permian, Kansas: Snider, 1736.
- Fort Riley limestone member, Permian, Kansas: Moore, 1346.
- Fort Scott limestone, Pennsylvanian, Kansas and Oklahoma: Snider, 1736.

- Fort Scott limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Fort Thompson beds, Pleistocene, Florida: Sellards, 1646, 1647, 1648.
- Fort Union formation, Tertiary, Montana: Hancock, 734.
- Fort Union formation, Tertiary, North and South Dakota: Stanton, 1756.
- Fort Union formation, Tertiary, North Dakota: Leonard, 1082.
- Fort Union formation, Tertiary, Wyoming: Hewitt, 811.
- Fort Wayne chert, Carboniferous, Georgia: McCallie, 1159.
- Fort Worth formation, Comanchean, Texas: Adkins, 6.
- Fort Worth formation, Cretaceous, Texas: Adkins and Winton, 7; Winton and Adkins, 2062.
- Fountain formation, Pennsylvanian, Colorado: Henderson, 795.
- Fox Hills beds, Cretaceous, Colorado: Henderson, 794.
- Fox Hills formation, Cretaceous, Colorado: Henderson, 795.
- Fox Hills group, Cretaceous, Colorado: Henderson, 794.
- Fox Hills sandstone, Cretaceous, North and South Dakota: Stanton, 1756.
- Fox Hills sandstone, Cretaceous, North Dakota: Leonard, 1082.
- Fox Hills (?) sandstone, Cretaceous, South Dakota: Darton, 461.
- Fox Hills sandstone, Cretaceous, Wyoming: Hancock, 735.
- Franciscan series, Jurassic (?) California: Kew, 980.
- Franconia formation, Cambrian, Wisconsin: Twenhofel and Thwaites, 1870.
- Franconia sandstone, Cambrian, Minnesota: Grout and Soper, 715.
- Franks conglomerate, Pennsylvanian, Oklahoma: Bloesch, 155; Decker, 483.
- Fraser River formation, Cretaceous, British Columbia: Reinecke, 1538.
- Frederick limestone, Ordovician, Maryland: Bassler, 90.
- Fredericksburg, Cretaceous, Texas: Dumble, 524.
- Fredericksburg division, Comanchean, Texas: Liddle and Prettyman, 1102; Snider, 1736.
- Fredericksburg division, Cretaceous, Texas: Winton and Adkins, 2062.
- Fredericksburg formation, Cretaceous, Texas: Adkins and Winton, 7.
- Freeport (Lower) limestone, Pennsylvanian, Ohio: Stout, 1794.
- Freeport (Lower) limestone, Pennsylvanian, West Virginia: Reger, 1528.
- Freeport (Lower) sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Freeport (Lower) sandstone, Pennsylvanian, West Virginia: Reger, 1528.
- Freeport (Upper) limestone, Pennsylvanian, Ohio: Stout, 1794.
- Freeport (Upper) limestone, Pennsylvanian, West Virginia: Reger, 1528.
- Freeport (Upper) sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Freeport (Upper) sandstone, Pennsylvanian, West Virginia: Reger, 1528.
- Frio formation, Eocene, Texas: Snider, 1736.
- Fronzosa terrane, Ordovician, New Mexico: Keyes, 993.
- Frontier formation, Cretaceous, Wyoming: Collier, 388, 389; Schultz, 1639.
- Fulton bed, Ordovician, Kentucky: Miller, 1293.
- Fulton green shale, Pennsylvanian, Ohio: Stout, 1794.
- Furnaceville (Sodus) shale member, Silurian, Ontario: Williams, 2034.
- Fuson formation, Cretaceous, Wyoming: Hancock, 735, 737.
- Galena formation, Ordovician, Illinois: Cadz, 267, 270.
- Galena limestone, Ordovician, Minnesota: Grout and Soper, 715.
- Galesburg shale, Pennsylvanian, Iowa: Tilton, 1846.
- Galesburg shale, Pennsylvanian, Kansas: Snider, 1736.
- Galesburg shale member, Pennsylvanian, Kansas: Moore, 1846.
- Galesteo terrane, Miocene, New Mexico: Keyes, 993.
- Galice formation, Jurassic, Oregon: Smith and Packard, 1728.
- Gallisteo formation, Tertiary, New Mexico: Baker, 55.
- Gallatin limestone, Cambrian, Wyoming: Collier, 389.
- Gallego sandstone member, Cretaceous, New Mexico: Winchester, 2061.
- Gallegos terrane, Permian, New Mexico: Keyes, 993.
- Gallinas terrane, Cretaceous, New Mexico: Keyes, 993.
- Gannett group, Cretaceous (?), Idaho:

- Garrard, Ordovician, Kentucky: Miller, 1298.
- Garrett terrane, Comanchean, New Mexico: Keyes, 993.
- Garrison limestone and shale, Permian, Kansas: Snider, 1736.
- Garrison limestone and shale member, Permian, Kansas: Moore, 1846.
- Gasconade formation, Ordovician, Missouri: Tarr, 1817.
- Gasper, Mississippian, Kentucky: Miller, 1298.
- Gasper oolite, Mississippian, Indiana: Malott and Thompson, 1206.
- Gasper oolite, Mississippian, Kentucky: Butts, 259.
- Gasper oolite, Mississippian, Tennessee: Butts, 258.
- Gasport dolomite member, Silurian, Ontario: Williams, 2034.
- Gatun formation, Miocene, Panama Canal Zone: MacDonald, 1170; Vaughan, 1910.
- Gatun formation, Miocene, Panama and Costa Rica: MacDonald *et al.*, 1171.
- Gaudalupe formation, Permian, New Mexico: Merritt, 1280.
- Gaysport member, Pennsylvanian, Ohio: Stout, 1794.
- Genudewa formation, Devonian, New York: Hussakof and Bryant, 884.
- Georgetown formation, Cretaceous, Texas: Sellards, 1653; Snider, 1736.
- Georgetown formation, Cretaceous, Texas: Udden, 1880.
- Georgetown limestone, Cretaceous, Texas: Christner and Wheeler, 339; Dumble, 524.
- Gerome andesite, Tertiary, Washington: Weaver, 1970.
- Giants Range granite, pre-Cambrian, Minnesota: Grout and Broderick, 716.
- Gila conglomerate, Quaternary, Arizona: Ransome, 1507; Schwennesen, 1640.
- Gillan series, Pleistocene, New Mexico: Keyes, 993.
- Gilbert shale, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Gilbert (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Gilbert (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Gilboy sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Gilliam formation, Permo-Carboniferous, Texas: Bose, 161.
- Gilmore sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Girard shales, Pennsylvania: Decker, 483.
- Glen Dean, Mississippian, Kentucky: Miller, 1298.
- Glen Dean limestone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1973.
- Glen Dean limestone, Mississippian, Indiana: Malott and Thompson, 1206.
- Glen Dean limestone, Mississippian, Tennessee: Butts, 258.
- Glenn formation, Pennsylvanian, Oklahoma: Bloesch, 155.
- Glenrose formation, Cretaceous, Texas: Sellards, 1653.
- Glen Rose formation, Cretaceous, Texas: Snider, 1736; Udden, 1880.
- Glen Rose limestone, Cretaceous, Texas: Dumble, 524; Matteson, 1231; Winton and Adkins, 2062.
- Glorieta sandstone, Permian, New Mexico: Baker, 55.
- Glorietta terrane, Cretaceous, New Mexico: Keyes, 993.
- Golconda, Mississippian, Kentucky: Miller, 1298.
- Golconda formation, Mississippian, Illinois: Weller *et al.*, 1973.
- Golconda limestone, Mississippian, Illinois: Weller, 1974.
- Golconda limestone, Mississippian, Indiana: Malott and Thompson, 1206.
- Golconda limestone and shale, Mississippian, Indiana: Malott, 1205.
- Golconda shale, Mississippian, Tennessee: Butts, 258.
- Goldenville formation, Nova Scotia: Fairbairn, 572.
- Goodland formation, Cretaceous, Texas: Adkins and Winton, 7.
- Goodland limestone, Cretaceous, Arkansas: Miser, 1319.
- Goodland limestone, Cretaceous, Texas: Winton and Adkins, 2062.
- Gordon sand, Mississippian, Texas: Matteson, 1231.
- Gordon formation, Pennsylvanian, Texas: Plummer, 1475.
- Gore (Upper Mercer) limestone, Pennsylvanian, Ohio: Stout, 1794.
- Goshen schist, Vermont: Foye, 620.
- Gosport greensand, Tertiary, Alabama: Brantley, 191.
- Gowanda beds, Devonian, New York: Chadwick, 308.
- Graford formation, Pennsylvanian, Texas: Plummer, 1475.
- Graford limestone, Pennsylvanian, Texas: Snider, 1736.
- Grainger shale, Devonian and Mississippian, Virginia: Harnsberger, 749.
- Grande terrane, Mississippian, New Mexico: Keyes, 993.
- Grand Gulf formation, Tertiary, Mississippi: Lowe, 1140.
- Grand Gulf group, Tertiary, Alabama: Brantley, 191.
- Grand Gulf group, Tertiary, Mississippi: Lowe, 1138.
- Grand Rapids formation, Cretaceous, Alberta: McLearn, 1198.
- Grand Tower limestone, Devonian, Illinois: Savage, 1604, 1605; Weller *et al.*, 1973.
- Graneros shale, Cretaceous, Kansas: Darton, 462; Snider, 1736.
- Graneros shale, Cretaceous, New Mexico: Garrett, 640.

- Graneros shale, Cretaceous, South Dakota : Darton, 461.
- Graneros shale, Cretaceous, Wyoming : Hancock, 735, 736.
- Graneros shale member, Cretaceous, Kansas : Moore, 1346.
- Granite Mountain porphyry, Arizona : Ransome, 1507.
- Grapevine sandstone, Pennsylvanian, West Virginia : Reger, 1528.
- Graphic terrane, Proterozoic, New Mexico : Keyes, 993.
- Grayhorse limestone, Pennsylvanian, Oklahoma : Bowen *et al.*, 172.
- Grayson formation, Comanchean, Texas : Adkins, 6.
- Grayson formation, Cretaceous, Texas : Adkins and Winton, 7.
- Grayson marl, Cretaceous, Texas : Winton and Adkins, 2962.
- Grayson marls, Comanchean, Texas : Snider, 1736.
- Great Smoky formation, Cambrian, Georgia : McCallie, 1159.
- Greenbrier limestone, Mississippian, West Virginia : Reger, 1528.
- Greencastle bed, Ordovician, Maryland : Bassler, 90.
- Greendale bed, Ordovician, Kentucky : Miller, 1293.
- Greene formation, Permian, Ohio : Stauffer and Schroyer, 1757.
- Greenhorn limestone, Cretaceous, Kansas : Darton, 462 ; Snider, 1736.
- Greenhorn limestone, Cretaceous, New Mexico : Garrett, 640.
- Greenhorn limestone, Cretaceous, South Dakota : Darton, 461.
- Greenhorn limestone, Cretaceous, Wyoming : Hancock, 735, 736.
- Greenhorn limestone member, Cretaceous, Kansas : Moore, 1346.
- Greenleaf sandstone, Cretaceous, Kansas : Twenhofel, 1871.
- Green River formation, Eocene, Colorado : Lunt, 1149.
- Green River formation, Tertiary, Wyoming : Schultz, 1639.
- Green River formation, Wyoming : Schramm, 1622.
- Greer formation, Permian, Kansas : Moore, 1346 ; Snider, 1736.
- Greer formation, Permian, Texas : Beede, 109 ; Gould, 678.
- Greer terrane, Permian, New Mexico : Keyes, 993.
- Grenville, pre-Cambrian, Ontario : Miller and Knight, 1201, 1202.
- Grenville series, pre-Cambrian, New York : Alling, 26, 28 ; Miller, 1302, 1303, 1309.
- Grenville series, pre-Cambrian, Quebec : Cooke, 401 ; Wilson, 2051.
- Grimsby sandstone member, Silurian, Ontario : Williams, 2084.
- Grizzly Bear formation, Cretaceous, Alberta : Slipper, 1712.
- Grizzly Peak rhyolite, Tertiary, Colorado : Howell, 874.
- Gros Ventre formation, Cambrian, Wyoming : Collier, 389.
- Guadalupian series, Permian, New Mexico : Keyes, 993.
- Guayama series, Comanchean or Cretaceous, Porto Rico : Hodge, 837.
- Gubbik sand, Pleistocene, Alaska : Dall, 451.
- Guelph formation, Silurian, Ontario : Williams, 2084.
- Gunflint formation, pre-Cambrian, Minnesota : Broderick, 198.
- Gunsight formation, Pennsylvanian, Texas : Plummer, 1475.
- Gunsight limestone, Pennsylvanian, Texas : Snider, 1736.
- Gunter sandstone, Cambrian, Missouri : Dake, 441.
- Gurabo formation, Miocene, Dominican Republic : Cooke, 400 ; Maury, 1249.
- Guyandot sandstone, Pennsylvanian, West Virginia : Hennen, 797 ; Reger, 1528.
- Guyandot (Lower) sandstone, Pennsylvanian, West Virginia : Hennen, 797.
- Hackberry shale, Permian, Kansas : Snider, 1736.
- Hackberry stage, Devonian, Iowa : Fenton, 580.
- Hague gneiss, pre-Cambrian, New York : Alling, 28.
- Halleyburian, pre-Cambrian, Ontario : Miller and Knight, 1301, 1302.
- Halleybury formation, Ordovician, Ontario : Hume, 881.
- Hale formation, Pennsylvanian, Arkansas : Miser, 1319.
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Hiuronian (Upper) group, pre-Cambrian, Michigan: Allen, 25.
Hygiene sandstone member, Cretaceous, Colorado: Henderson, 794.
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Jacksboro limestone, Pennsylvanian, Texas: Plummer, 1475.
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Jackson formation, Tertiary, Mississippi: Lowe, 1140.
Jackson formation, Tertiary, Texas: Dumble, 524; Udden, 1880.
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Jefferson City dolomite, Ordovician, Missouri: Branson, 190.
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Jenkins shale member, Permian, Kansas: Moore, 1846.
Jessamine substage, Ordovician, Kentucky: Miller, 1293.
Joachim dolomite, Ordovician, Missouri: Branson, 190.
Joachim formation, Ordovician, Missouri: Dake, 441.
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Juana Diaz marls, Tertiary, Porto Rico: Berkeley, 124; Maury, 1248.
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262 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1919-1929.

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 Leonard formation, Permian, Texas: Beede, 109.
 Leonard formation, Permo-Carboniferous, Texas: Bøse, 161.
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 Lime Creek stage, Devonian, Iowa: Fenton, 580.
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- Marble Falls limestone**, Mississippian, Texas: Matteson, 1231.
- Marble Falls limestone**, Pennsylvanian, Texas: Girty, 659; Moore, 1344; Plummer, 1475; Snider, 1736.
- Marble Falls series**, Pennsylvanian, Texas: Girty and Moore, 660.
- Marcy anorthosite**, pre-Cambrian, New York: Miller, 1303, 1304.
- Marianna limestone**, Tertiary, Alabama: Brantley, 191.
- Marianna limestone**, Tertiary, Mississippi: Lowe, 1138.

- Maricopa shale, Miocene, California: Pack, 1415.
- Marietta (Lower) sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Marietta (Upper) sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Marine formation, Tertiary, Texas: Dumble, 524.
- Marion formation, Permian, Kansas: Moore, 1346; Snider, 1736.
- Marks Head marl, Miocene, Georgia: Vaughan, 1910.
- Marks Head marl, Tertiary, Georgia: McCallie, 1159.
- Marland sand, Oklahoma: Aurin, 50.
- Marlbrook marl, Cretaceous, Arkansas: Miser, 1319.
- Marmaton formation, Pennsylvanian, Kansas: Boughton, 170; Moore, 1346; Moore and Elledge, 1347; Snider, 1736.
- Martin limestone, Devonian, Arizona: Mitchell, 1322; Ransome, 1507.
- Martinez formation, Eocene, California: Kew, 979.
- Martinez group, Eocene, California: Clark, 341.
- Martinian series, Devonian, New Mexico: Keyes, 993.
- Martinsburg shale, Ordovician, Maryland: Bassler, 90.
- Mascall formation, Miocene, Oregon: Smith and Packard, 1728.
- Massillon sandstone, Pennsylvania, Ohio: Stout, 1794.
- Matawan formation, Cretaceous, Maryland and Delaware: Bascom and Miller, 86.
- Matfield shale, Permian, Kansas: Snider, 1736.
- Matfield shale member, Permian, Kansas: Moore, 1346.
- Mattagami series, pre-Cambrian, Quebec: Cooke, 401.
- Mauch Chunk, Carboniferous, Kentucky: Jillson, 918.
- Mauch Chunk series, Mississippian, West Virginia: Hennen, 797; Reger, 1528.
- Maxville limestone, Mississippian, Ohio: Stout, 1794.
- Maxwell terrane, Cenozoic (Tertiary), New Mexico: Keyes, 993.
- Maya terrane, Cenozoic (Tertiary), New Mexico: Keyes, 993.
- Mayaguez shales, Porto Rico: Berkey, 124.
- Mayes formation, Mississippian, Oklahoma: Snider, 1736.
- Maysville group, Ordovician, Tennessee: Butts, 258.
- Maysville stage, Ordovician, Kentucky: Miller, 1293.
- Mazarrn shale, Ordovician, Arkansas: Miser, 1319.
- Mazomanie sandstone, Cambrian, Wisconsin: Ulrich, 1891.
- Medicine beds, Cretaceous, Kansas: Twenhofel, 1871.
- Medicine Lodge gypsum, Permian, Kansas: Snider, 1736.
- Medicine Lodge gypsum member, Permian, Kansas: Moore, 1346.
- Medina-Cataract formation, Silurian, Ontario: Williams, 2034.
- Meganos group, Eocene, California: Clark, 341, 342.
- Memphremagog slates, Ordovician, Vermont: Richardson, 1544, 1545, 1546.
- Menard, Mississippian, Kentucky: Miller, 1293.
- Menard limestone, Mississippian, Illinois: Weller, 1974; Weller et al., 1973.
- Mendon series, Algonkian, Vermont: Foye, 620.
- Menefee formation, Cretaceous, Colorado: Collier, 386.
- Mentor beds, Cretaceous, Kansas: Twenhofel, 1871.
- Meramec group, Mississippian, Illinois: Hinds, 382; Weller et al., 1973.
- Mercer (Lower) limestone, Pennsylvanian, Ohio: Stout, 1794.
- Mercer (Upper) limestone, Pennsylvanian, Ohio: Stout, 1794.
- Merom sandstone, Mississippian, Indiana: Logan, 1120.
- Mesaverde formation, Cretaceous, Colorado: Crawford et al., 416; Perini and Collins, 1461.
- Mesaverde formation, Cretaceous, New Mexico: Wells, 1978.
- Mesaverde formation, Cretaceous, Wyoming: Collier, 388, 389; Schultz, 1639.
- Mesaverde granite, Cretaceous, Colorado: Collier, 386.
- Mesa Verde group, Cretaceous, Utah: Forrester, 610.
- Mescal limestone, Cambrian, Arizona: Ransome, 1507.
- Mesa Verde sandstone, Colorado: Haas, 727.
- Mesa Verde terrane, Cretaceous, New Mexico: Keyes, 993.
- Metchosin basalts, Eocene, British Columbia: Cooke, 402.
- Metchosin formation, Tertiary, British Columbia: Dolmage, 507.
- Meyersdale red shale, Pennsylvanian, Maryland: Swartz, 1804.
- Miami oolitic limestone, Pleistocene, Florida: Sellards, 1647, 1648.
- Miami limestone, Florida: Sellards, 1646.
- Middle Park formation, Tertiary, Colorado: Chamberlin, 312.
- Midway formation, Eocene, Texas: Sellards, 1653.
- Midway formation, Tertiary, Georgia: McCallie, 1159.
- Midway formation, Tertiary, Mississippi: Lowe, 1140.
- Midway formation, Tertiary, Texas: Dumble, 524; Udden, 1880.
- Midway group, Eocene, Texas: Snider, 1736.
- Midway group, Tertiary, Alabama: Brantley, 191.
- Midway group, Tertiary, Mississippi: Lowe, 1138.

- guel formation, Cretaceous, New Mexico: Winchester, 2061.
 ford series, Jurassic, British Columbia: Bancroft, 66.
 k River sandstones, Cretaceous, Alberta: Slipper, 1712.
 liken sandstone, Cretaceous, Colorado: Henderson, 794.
 llon bed, Ordovician, Kentucky: Miller, 1293.
 llap division, Pennsylvanian, Texas: Plummer, 1475.
 mbresian series, Ordovician, New Mexico: Keyes, 993.
 neola limestone, Devonian, Missouri: Branson, 190.
 neral Wells sandstone, Pennsylvanian, Texas: Plummer, 1475.
 innekahta limestone, Permian (?), Wyoming: Hancock, 735.
 innelusa sandstone, Pennsylvanian, Wyoming: Hancock, 735.
 isenheimer shale, Devonian, Illinois: Savage, 1604, 1605.
 ispec group, Devonian, New Brunswick: Bailey and Matthew, 52.
 ission argillite, Paleozoic, Washington: Weaver, 1970.
 ission sandstone, Pennsylvanian, Oklahoma: Goldman and Robinson, 667.
 issisquoi schists, Cambrian, Vermont: Richardson, 1546.
 ississippian series, Carboniferous, Kentucky: Shaw and Mather, 1680.
 issouri group, Pennsylvanian, Kansas: Moore, 1346; Snider, 1736.
 issouri stage, Pennsylvanian, Iowa: Arey, 35, 36; Tilton, 1846, 1847.
 issouri Mountain slate, Silurian, Arkansas: Miser, 1319.
 istassin limestone, pre-Cambrian, Quebec: Cooke, 401.
 itchell limestone, Mississippian, Indiana: Logan, 1120; Malott, 1205.
 itchell limestone group, Mississippian, Indiana: Malott and Thompson, 1206.
 itodelo formation, Miocene, California: Kew, 979.
 itodoc terrane, Mississippian, New Mexico: Keyes, 993.
 Moenkopi formation, Triassic, Arizona: Shimer, 1693.
 Moenkopi formation, Triassic, Utah: Clark, 344.
 Movable series, pre-Cambrian, Newfoundland: Buddington, 226.
 Mona shale, Oligocene, Panama and Costa Rica: MacDonald *et al.*, 1171.
 Monitor sandstone, Pennsylvanian, West Virginia: Hennen, 797; Rorer, 1528.
 Monongahela series, Pennsylvanian, Kentucky: Miller, 1293.
 Monroe Creek beds, Miocene, South Dakota: O'Harra, 1389.
 Mons formation, Cambrian, Alberta: Walcott, 1928.
 Montana group, Cretaceous, Alberta: McLearn, 1187.
 Montana group, Cretaceous, Colorado: Henderson, 794.
 Montell sandstone, Pennsylvanian, Maryland: Swartz, 1804.
 Monterey group, Miocene, California: Kew, 979, 980.
 Monterey group, Tertiary, California: Pack, 1415.
 Monterey sandstone, Devonian, Virginia: Holden, 845.
 Monterey series, Tertiary, California: Stock, 1770.
 Montosa terrane, Pennsylvanian, New Mexico: Keyes, 993.
 Montoyan series, Ordovician, New Mexico: Keyes, 993.
 Moody's Branch marls, Tertiary, Mississippi: Lowe, 1188.
 Moorefield shale, Mississippian, Arkansas: Miser, 1319, 1320.
 Moran formation, Pennsylvanian, Texas: Plummer, 1475.
 Moran limestone, Pennsylvanian, Texas: Snider, 1736.
 Morgantown sandstone, Pennsylvanian, Ohio: Stout, 1794.
 Morne l'Enfer formation, Tertiary, Trinidad: Macreadv, 1195.
 Morrison formation, Cretaceous, Colorado: Lee, 1067.
 Morrison (?) formation, Cretaceous (?), Montana: Hancock, 734.
 Morrison formation, Cretaceous (?), Wyoming: Collier, 389; Hancock, 735, 737.
 Morrison formation, Jurassic, New Mexico: Garrett, 640.
 Morrison formation, Jurassic or Cretaceous, Colorado: Henderson, 795.
 Morrisonian series, Jurassic, New Mexico: Keyes, 993.
 Morrow group, Pennsylvanian, Arkansas: Miser, 1319.
 Mosca terrane, Pennsylvanian, New Mexico: Keyes, 993.
 Mountain Glen shale, Devonian, Illinois: Savage, 1604, 1605.
 Mount Auburn, Ordovician, Kentucky: Miller, 1293.
 Mount Champion monzonite, pre-Cambrian, Colorado: Howell, 874.
 Mount Holley series, Algonkian, Vermont:

- Mount Selman formation, Eocene, Texas: Snider, 1736.
- Mount Selman formation, Tertiary, Texas: Dumble, 524; Udden, 1880.
- Mowry shale, Cretaceous, Wyoming: Collier, 389; Hancock, 735, 736.
- Muda limestone, Pleistocene (?). Porto Rico: Semmes, 1655.
- Murchison formation, Cambrian, Alberta: Walcott, 1928.
- Murfreesboro limestone, Ordovician, Tennessee: Galloway, 633.
- Murphy marble, Cambrian, Georgia: McCallie, 1159.
- Myrtle formation, Cretaceous, Oregon: Harrison and Eaton, 761; Smith and Packard, 1728.
- Nacatoch sand, Cretaceous, Arkansas: Miser, 1819.
- Nacatosh sand, Cretaceous, Texas: Dumble, 524.
- Nacimlentan series, Eocene, New Mexico: Keyes, 993.
- Naco limestone, Pennsylvanian, Arizona: Mitchell, 1322.
- Nocogdoches formation, Tertiary, Texas: Dumble, 524.
- Naheola formation, Tertiary, Alabama: Brantley, 191.
- Nalad terrane, Silurian, New Mexico: Keyes, 993.
- Nanafalla formation, Tertiary, Alabama: Brantley, 191.
- Nanaimo formation, Cretaceous, British Columbia: Dolmage, 506.
- Nantahala slate, Cambrian, Georgia: McCallie, 1159.
- Naparima clay, Tertiary, Trinidad: Macready, 1195.
- Nashua formation, Pliocene, Florida: Sellards, 1647.
- Nashua marls, Tertiary, Florida: Sellards, 1648.
- Natchez formation, Pleistocene, Mississippi: Lowe, 1138.
- National River formation, Pennsylvanian, Alaska: Blackwelder, 151.
- Navajo sandstone, Jurassic, Utah: Clark, 344.
- Navajo terrane, Cretaceous, New Mexico: Keyes, 993.
- Navarro beds, Cretaceous, Texas: Udden, 1880.
- Navarro formation, Cretaceous, Texas: Dumble, 524; Sellards, 1650, 1653; Snider, 1736.
- Nebraska beds, Miocene, South Dakota: O'Harra, 1389.
- Nebraskan drift, Pleistocene: Baker, 56.
- Nebraskan stage, Pleistocene, Iowa: Arey, 35, 36; Tilton, 1846, 1847.
- Nelson batholith, Jurassic, British Columbia: Schofield, 1617.
- Nelson granite, Jurassic, British Columbia: Schofield, 1619.
- Nelson granodiorite, Jurassic, British Columbia: Bancroft, 66.
- Nelson River limestone, Ordovician, Canada: Savage and Van Tuyl, 1603.
- Nemenjish series (?), pre-Cambrian, Canada: Cooke, 401.
- Nemenjish series, pre-Cambrian, Quebec: Cooke, 407.
- Nenana gravel, Tertiary, Alaska: Capps, 291.
- Nerukpuk schist, pre-Cambrian, Alaska: Leffingwell, 1074.
- Neva limestone, Pennsylvanian, Kansas and Oklahoma: Snider, 1736.
- Neva limestone, Pennsylvanian, Oklahoma: Bowen *et al.*, 172.
- Neva limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Newaukum series, pre-Puget in age, Washington: Culver, 428.
- New Glasgow series, Carboniferous, Nova Scotia: Hayes, 772.
- Newland formation, Algonkian, Idaho: Jones, 944.
- Newlon limestone and shale, Pennsylvanian, West Virginia: Reger, 1528.
- Newman limestone, Mississippian, Virginia: Harnsberger, 749.
- New Providence shale, Mississippian, Kentucky: Shaw and Mather, 1680.
- New Province shale, Mississippian, Tennessee: Butts, 258; Mather, 1227.
- New Richmond formation, Ordovician, Illinois: Cady, 267.
- New Richmond sandstone, Illinois: Cady, 266.
- New River group, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- New Scotland limestone, Devonian, New York: Jones, 951.
- Niagara group, Silurian, Ontario: Williams, 2034.
- Niagara limestone, Silurian, Kentucky: Jillson, 918; Miller, 1297.
- Niagara limestone, Silurian, New York: Giles, 651.
- Nickel Plate formation, Triassic or Jurassic, British Columbia: Schofield, 1620.
- Nicolai greenstone, Triassic, Alaska: Bateman and McLaughlin, 98.
- Nineveh limestone: Permian, Ohio: Stauffer and Schroyer, 1757.
- Nineveh sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Ninos terrane, Archeozoic, New Mexico: Keyes, 993.
- Niobrara formation, Cretaceous, Colorado: Henderson, 795.
- Niobrara formation, Cretaceous, Kansas: Darton, 462; Moore, 1346.
- Niobrara formation, Cretaceous, North Dakota: Leonard, 1082.
- Niobrara formation, Cretaceous, South Dakota: Darton, 461.
- Niobrara formation, Cretaceous, Wyoming: Hancock, 736.
- Niobrara shale, Cretaceous, Wyoming: Collier, 388; Hancock, 735.

- Nipissing diabase, pre-Cambrian, Ontario: Whitehead, 2010.
- Nittinat formation, Triassic (?), British Columbia: Dolmage, 506.
- Nora formation, Devonian, Iowa: Fenton, 580.
- Normanskill shales, Ordovician, New York: Jones, 951.
- Norrie member, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Northfield conglomerate, Ordovician, Vermont: Richardson, 1545.
- North Fork shale, Pennsylvanian, West Virginia: Hennen, 797.
- Northport limestone, Paleozoic, Washington: Weaver, 1970.
- Northport terrace, Pleistocene, Alabama: Brantley, 191.
- Norton formation, Pennsylvanian, Virginia: Harnsberger, 750.
- Nounan formation, Cambrian, Idaho: Mansfield, 1211.
- Nowata shale, Pennsylvanian, Oklahoma: Snider, 1786.
- Nowata shale member, Pennsylvanian, Kansas: Moore, 1346.
- Nugget sandstone, Jurassic, Idaho: Mansfield, 1211, 1214, 1216.
- Nugget sandstone, Jurassic, Wyoming: Schultz, 1639.
- Nuttall (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Nuttall (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Oatka beds, Silurian, New York: Williams, 2034.
- Oak Hill clay, Pennsylvanian, Ohio: Stout, 1794.
- Oakville formation, Tertiary, Texas: Dumble, 524.
- Ocala formation, Eocene, Florida: Sellards, 1647.
- Ocala formation, Tertiary, Florida: Sellards, 1648.
- Ocala limestone, Eocene, Florida: Cushman, 481.
- Ocala limestone, Tertiary, Georgia: McCallie, 1149.
- Orca group, Mesozoic or Tertiary, Alaska: Johnson, 930.
- Orchard Creek shale, Silurian, Illinois: Savage, 1602.
- Oread limestone, Pennsylvanian, Oklahoma: Robinson and Mills, 1560.
- Ogalalla formation, Cretaceous, Kansas: Moore, 1346.
- Ogalalla formation, Tertiary, Kansas: Darton, 462.
- Ogdensburg dolomite, Ordovician, New York: Chadwick, 810.
- Ohara, Mississippian, Kentucky: Miller, 1293.
- Ohara (Lower) limestone member, Mississippian, Illinois: Weller *et al.*, 1973.
- Ohio shale, Kentucky: Miller, 1293.
- Okaw limestone, Mississippian, Illinois: Weller, 1974.
- Okaw limestone, Mississippian, Indiana: Hole, 847.
- Okay limestone, Pennsylvanian, Oklahoma: Heald, 777.
- Okafenekee formation, Quaternary, Georgia: McCallie, 1159.
- Okesa sandstone, Carboniferous, Oklahoma: Hopkins and Powers, 854.
- Old Dominion limestone, Paleozoic (?), Washington: Weaver, 1970.
- Oldham limestone, Silurian, Kentucky: Miller, 1293.
- Olive Hill formation, Devonian, Tennessee: Dunbar, 525.
- Onelda glass sand, Pleistocene, New York: Colony, 392.
- Oneota dolomite, Ordovician, Minnesota: Grout and Soper, 715.
- Oneota formation, Ordovician, Illinois: Cady, 267.
- Oneota formation, Ordovician, Wisconsin: Twenhofel and Thwaites, 1870.
- Onondaga limestone, Devonian, Kentucky: Jillson, 918.
- Onondaga limestone, Devonian, New York: Hussakof and Bryant, 884; Jones, 951.
- Opeche formation, Permian (?), Wyoming: Hancock, 734.
- Opex dolomite, Cambrian, Utah: Lindgren and Loughlin, 1104.
- Ophir formation, Cambrian, Utah: Butler, 255; Lindgren and Loughlin, 1104; Wichman, 2024.
- Opohonga limestone, Ordovician, Utah: Lindgren and Loughlin, 1104.
- Oread limestone, Pennsylvanian, Kansas and Oklahoma: Snider, 1786.
- Oread limestone, Pennsylvanian, Oklahoma: Heald, 777; Heald and Bowen, 778.
- Oread limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Oregon bed, Ordovician, Kentucky: Miller, 1293.
- Orient gneiss, pre-Cambrian (?), Washington: Weaver, 1970.
- Oriskany group, Devonian, Tennessee: Dunbar, 525.
- Oriskany formation, Devonian, New York and Pennsylvania: Fetteke, 588.
- Oriskany sandstone, Devonian, New York: Colony, 392.
- Osaage formation, Mississippian, Illinois: Weller *et al.*, 1973.
- Osgood stage, Silurian, Kentucky: Miller, 1293.
- Oswayo formation, Devonian-Carboniferous, Pennsylvania: Decker, 483.
- Otis limestone, Devonian, Iowa: Norton, 1381.
- Owen substage, Devonian, Iowa: Fenton, 580.
- Owl Creek marl, Cretaceous, Mississippi: Lowe, 1138.

- Owl Creek member, Cretaceous, Tennessee: Wade, 1922.
- Pabst member, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Packard rhyolite, Utah: Lindgren and Loughlin, 1105.
- Packsaddle schist, pre-Cambrian, Texas: Snider, 1736.
- Pahasapa limestone, Mississippian, Wyoming: Hancock, 735.
- Paint Creek formation, Mississippian, Illinois: Weller *et al.*, 1978.
- Paint Creek limestone, Mississippian, Illinois: Weller, 1974.
- Paint Creek limestone, Mississippian, Indiana: Hole, 847.
- Pakowki shales, Cretaceous, Alberta: Slipper, 1712.
- Pala conglomerate, Quaternary, California: Ellis, 542.
- Palestine, Mississippian, Kentucky: Miller, 1293.
- Palestine sandstone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1978.
- Pallside andesite (Conejos formation), Tertiary, Colorado: Patton, 1454.
- Palm Beach limestone, Pleistocene, Florida: Sellards, 1647, 1648.
- Palmer volcanics, Tertiary, Washington: Weaver, 1970.
- Palma formation, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Palomasan series, Pleistocene, New Mexico: Keyes, 993.
- Palo Pinto formation, Pennsylvania, Texas: Plummer, 1475.
- Palo Pinto limestone, Pennsylvanian, Texas: Snider, 1736.
- Paluxy sand, Cretaceous, Texas: Dumble, 524; Matteson, 1281; Snider, 1736.
- Paluxy sands, Cretaceous, Texas: Udden, 1880; Winton and Adkins, 2062.
- Pamlico formation, Quaternary, North Carolina and Virginia: Hay, 767.
- Panama formation, Miocene, Canal Zone: MacDonald, 1170.
- Park formation, Carboniferous, Wyoming: Collier, 387.
- Park City formation, Carboniferous, Wyoming: Collier, 389.
- Park City formation, Permian, Wyoming: Schultz, 1639.
- Pascagoula formation, Tertiary, Alabama: Brantley, 191.
- Pascagoula clay, Tertiary, Mississippi: Lowe, 1188.
- Paskapoo formation, Tertiary, Alberta: Allan, 20; Slipper, 1712.
- Paso Robles formation, Tertiary, California: Pack, 1415.
- Patapasco formation, Cretaceous, Maryland: Berry, 141.
- Patapasco formation, Cretaceous, Maryland and Delaware: Bascom and Miller, 86.
- Patuxent formation, Cretaceous, Maryland: Berry, 141.
- Patuxent formation, Cretaceous, Maryland and Delaware: Bascom and Miller, 86.
- Pawhuska limestone, Pennsylvanian, Oklahoma: Snider, 1736.
- Pawnee Creek beds, Tertiary, Colorado: Loomis, 1123.
- Pawnee limestone, Pennsylvanian, Kansas and Oklahoma: Snider, 1736.
- Pawnee limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Pawpaw formation, Comanchean, Texas: Adkins, 6.
- Pawpaw formation, Cretaceous, Texas: Adkins and Winton, 7; Winton and Adkins, 2062.
- Peace River formation, Cretaceous, Alberta: McLearn, 1187, 1188.
- Pearl shale, Permian, Kansas: Snider, 1736.
- Pearl shale member, Permian, Kansas: Moore, 1346.
- Pecosian series, Pliocene, New Mexico: Keyes, 993.
- Pecurian series, Archeozoic, New Mexico: Keyes, 993.
- Peerless sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1258.
- Pegram limestone, Devonian, Tennessee: Dunbar, 525.
- Pelican sandstone, Cretaceous, Alberta: McLearn, 1188.
- Pelican shale, Cretaceous, Alberta: McLearn, 1188.
- Penasco terrane, Archeozoic, New Mexico: Keyes, 993.
- Pence member, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Pend Oreille group, Washington and British Columbia: Weaver, 1970.
- Pennington group, Mississippian, Virginia: Harnsberger, 749.
- Pennington shale, Carboniferous, Georgia: McCallie, 1159.
- Pennington shale, Mississippian, Tennessee: Batts, 258.
- Penters chert, Devonian, Arkansas: Miser, 1319, 1320.
- Peorian interglacial interval, Pleistocene: Baker, 56.
- Pepino formation, Tertiary, Porto Rico: Hubbard, 377; Maury, 1248.
- Percharan series, Devonian, New Mexico: Keyes, 993.
- Permian system, Kansas: Moore, 1346.
- Perry group, Devonian, New Brunswick: Bailey and Matthew, 52.
- Perryville substage, Ordovician, Kentucky: Miller, 1293.
- Peterson limestone, Cretaceous (?), Idaho: Mansfield, 1216.
- Phalen Lake volcanics, Tertiary, Washington: Weaver, 1970.
- Phelps sandstone, Mississippian, Missouri: Dake, 441.
- Phosphoria formation, Permian, Idaho: Mansfield, 1211, 1216.

- Phosphoria formation, Permian, Montana : Condit, 395.
- Pictured Cliffs terrane, Cretaceous, New Mexico : Keyes, 993.
- Pierce limestone, Ordovician, Tennessee : Galloway, 633.
- Pierpont sandstone, Pennsylvanian, West Virginia : Hennen, 797.
- Pierre formation, Cretaceous, Colorado : Henderson, 795.
- Pierre group, Cretaceous, Colorado : Henderson, 794.
- Pierre shale, Cretaceous, Kansas : Darton, 462 ; Moore, 1346 ; Snider, 1736.
- Pierre shale, Cretaceous, New Mexico : Garret, 640.
- Pierre shale, Cretaceous, North and South Dakota : Stanton, 1746.
- Pierre shale, Cretaceous, North Dakota : Leonard, 1082.
- Pierre shale, Cretaceous, South Dakota : Darton, 461.
- Pierre shale, Cretaceous, Wyoming : Hancock, 735, 737.
- Pike gravel member, Cretaceous, Arkansas : Miser, 1319.
- Pinal schist, pre-Cambrian, Arizona : Ransome, 1507.
- Pine Canyon limestone, Mississippian, Utah : Lindgren and Loughlin, 1105.
- Pine log conglomerate, pre-Cambrian, Georgia : Hull, 880 ; Hull *et al.*, 878.
- Pineville sandstone, Pennsylvanian, West Virginia : Hennen, 797 ; Reger, 1528.
- Pina Vitkos terrane, Cretaceous, New Mexico : Keyes, 993.
- Pinyon Peak limestone, Devonian, Utah : Lindgren and Loughlin, 1105.
- Pioneer shale, Cambrian, Arizona : Ransome, 1507.
- Pitkin limestone, Mississippian, Arkansas : Miser, 1319.
- Pittkin limestone, Mississippian, Oklahoma : Snider, 1736.
- Pittsburg (Upper) limestone, Pennsylvanian, Ohio : Stout, 1794.
- Pittsburgh (Upper) sandstone, Pennsylvanian, Ohio : Stout, 1794.
- Plattesville formation, Ordovician, Illinois : Cady, 267, 270.
- Platteville limestone, Ordovician, Minnesota : Grout and Soper, 715.
- Plattin limestone, Ordovician, Arkansas : Miser, 1319, 1320.
- Plattin limestone, Ordovician, Missouri : Foerste, 603.
- Plattsburg limestone, Pennsylvanian, Kansas : Boughton, 170 ; Snider, 1736.
- Plattsburg limestone member, Pennsylvanian, Kansas : Moore, 1346.
- Pleasanton shale, Pennsylvanian, Kansas : Snider, 1736.
- Plum Creek shale, Silurian, Kentucky : Miller, 1293.
- Plummer limestone, Pennsylvanian, Oklahoma : Heald and Mather, 780.
- Pluto shale, Mississippian, West Virginia : Reger, 1528.
- Plymouth member, pre-Cambrian, Wisconsin and Michigan : Hotchkiss, 865.
- Pocahontas group, Pennsylvanian, West Virginia : Hennen, 797.
- Pocahontas (Upper) sandstone, Pennsylvanian, West Virginia : Hennen, 797.
- Point Lookout sandstone, Cretaceous, Colorado : Collier, 386.
- Point Pleasant bed, Ordovician, Kentucky : Miller, 1293.
- Point Woodbury formation, Carboniferous or pre-Carboniferous, British Columbia : Schofield, 1617.
- Point Woodbury formation, Paleozoic, British Columbia : Schofield, 1619.
- Pokegama quartzite, pre-Cambrian, Minnesota : Grout and Broderick, 716.
- Polk Creek shale, Ordovician, Arkansas : Miser, 1319.
- Pomeroy sandstone, Pennsylvanian, Ohio : Stout, 1794.
- Ponce chalk beds, Tertiary, Porto Rico : Berkey, 124 ; Maury, 1248.
- Ponce limestone, Porto Rico : Hubbard, 877.
- Pondville conglomerate and arkose, Carboniferous, Rhode Island : Perkins, 1462.
- Pontiac series, pre-Cambrian, Quebec : Cooke, 401 ; Malliot, 1202.
- Porcupine Hills beds, Tertiary, Alberta : Slipper, 1712.
- Porcupine Hills formation, Eocene, Alberta : Stewart, 1766.
- Portage group, Devonian, Pennsylvania : Decker, 483.
- Porters Creek clay, Eocene, Kentucky : Miller, 1293.
- Porters Creek clay, Tertiary, Mississippi : Lowe, 1140.
- Porters Creek formation, Eocene, Tennessee : Schroeder, 1623.
- Porter's Creek formation, Tertiary, Mississippi : Lowe, 1138.
- Portersville member, Pennsylvanian, Ohio : Stout, 1794.
- Port Hudson beds, Quaternary, Louisiana : Emerson, 549.
- Port Hudson formation, Pleistocene, Mississippi : Lowe, 1138.
- Port Hudson formation, Pleistocene, Texas : Snider, 1736.
- Port Nelson limestone, Silurian, Canada : Savage and Van Tuyl, 1602.
- Portneuf limestone, Triassic, Idaho : Mansfield, 1211, 1216.
- Possum sandstone, Carboniferous, Oklahoma : Goldman, 665.
- Possum sandstone, Pennsylvanian, Oklahoma : Goldman and Robinson, 667.
- Potomac group, Cretaceous, Maryland and Delaware : Bascom and Miller, 86.
- Potomac marble, Triassic, Maryland : Dorsey, 510.
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272 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1919-1920.

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- Potsdam sandstone, Cambrian, New York: Alling, 26; Miller, 1204.
- Potsdam sandstones, Cambrian, New York: Chadwick, 310.
- Pottshoro subgroup, Comanchean, Texas: Snider, 1736.
- Pottsville conglomerate, Carboniferous, Kentucky: Jillson, 918.
- Pottsville formation, Carboniferous, Illinois: Cady, 267, 268.
- Pottsville formation, Carboniferous, Pennsylvania: Fettke, 588.
- Pottsville formation, Pennsylvanian, Illinois: Coryell, 410; Hinds, 832; Nebel, 1367.
- Pottsville formation, Pennsylvanian, Maryland: Swartz, 1804.
- Pottsville formation, Pennsylvanian, Ohio: Stout, 1794.
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- Pottsville series, Pennsylvanian, Kentucky: Miller, 1293.
- Pottsville series, Pennsylvanian, West Virginia: Reger, 1528.
- Poughquag quartzite, Cambrian, New York: Colony, 392.
- Poverty Run member, Pennsylvanian, Ohio: Stout, 1794.
- Poway conglomerate, Tertiary, California: Ellis, 542.
- Powell limestone, Ordovician, Arkansas: Miser, 1319.
- Prairie du Chien group, Ordovician, Illinois: Cady, 267.
- Pruss sandstone, Jurassic, Idaho: Mansfield, 1214, 1216.
- Prichard formation, Algonkian, Idaho: Jones, 944.
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- Princeton sandstone, Mississippian, Virginia: Harnsberger, 749.
- Proctor formation, Cambrian, Missouri: Tarr, 1817.
- Pueblo formation, Pennsylvanian, Texas: Puget series, Eocene, Washington: Culver, 428.
- Pulaski formation, Eocene, Oregon: Smith and Packard, 1728.
- Puncheon Creek sandstone, Carboniferous, Kentucky: Browning and Russell, 266.
- Purgatoire formation, Cretaceous, New Mexico: Garrett, 640.
- Putnam Hill limestone, Pennsylvania, Ohio: Stout, 1794.
- Pyburn limestone, Devonian, Tennessee: Dunbar, 525.
- Quadrant formation, Carboniferous, Montana: Conduit, 395.
- Quall limestone, Devonian, Tennessee: Dunbar, 525.
- Quartermaster formation, Permian, Texas: Gould, 678.
- Quartermaster terrane, Permian, New Mexico: Keyes, 993.
- Quebradillas limestone, Tertiary, Puerto Rico: Hubbard, 877; Maury, 1248.
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- Queen City beds, Tertiary, Texas: Dunbar, 524.
- Queen City formation, Eocene, Texas: Snider, 1736.
- Queenston shale, Ordovician, New York: Decker, 483.
- Quinnesec schists, pre-Cambrian, Michigan: Allen, 25.
- Quinnimont sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
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- Raccoon shale, Mississippian, Kentucky: Miller, 1393.
- Raleigh (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Raleigh (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Raleigh (Upper) (Sharon) sandstone, Pennsylvanian, West Virginia: Reger, 1528.
- Ralston group, Pennsylvanian, Oklahoma: Bloesch, 155.
- Randville dolomite, pre-Cambrian, Michigan: Allen, 25.
- Ranger formation, Pennsylvanian, Texas: Plummer, 1475.
- Ranger limestone, Pennsylvanian, Texas: Snider, 1736.
- Raritan formation, Cretaceous, Maryland

- Reagan sandstone, Cambrian, Oklahoma : Decker, 483.
- Redbank sand, Cretaceous, New Jersey : Mansfield, 1210.
- Red Bluff clay, Tertiary, Alabama : Brantley, 191.
- Red Bluff formation, Tertiary, Mississippi : Lowe, 1138.
- Red Eagle limestone, Pennsylvanian, Oklahoma : Bowen *et al.*, 172 ; Snider, 1736.
- Red Mountain formation, British Columbia : Schofield, 1620.
- Red Mountain rhyolite, Tertiary, Colorado : Howell, 874.
- Red Rock Canyon beds, Tertiary, California : Merriam, 1264.
- Redstone limestone, Pennsylvanian, Ohio : Stout, 1794.
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- Rex chert member, Permian, Idaho : Mansfield, 1211.
- Reynales (Wolcott) dolomite member, Silurian, Ontario : Williams, 2034.
- Reynosa limestone, Texas : Barton, 85.
- Rhinestreet shale, Devonian, New York : Hussakof and Bryant, 884.
- Rhode Island formation, Carboniferous, Rhode Island : Perkins, 1462.
- Ribstone Creek formation, Cretaceous, Alberta : Slipper, 1712.
- Ricardo beds, Tertiary, California : Merriam, 1264.
- Ricardo group, Tertiary, California : Merriam, 1264.
- Riceville shale, Devonian-Carboniferous, Pennsylvania : Decker, 483.
- Richmond stage, Ordovician, Kentucky : Miller, 1293.
- Ridenhower shale, Mississippian, Kentucky : Miller, 1293.
- Ridley limestone, Ordovician, Tennessee : Galloway, 633.
- Rio de la Plata series, Comanchean, Porto Rico : Hodge, 837.
- Rio Descalabrados series, Eocene, Porto Rico : Hodge, 837.
- Rio Jueyes series, Eocene, Porto Rico : Hodge, 837.
- Ripley formation, Cretaceous, Alabama : Brantley, 191.
- Ripley formation, Cretaceous, Georgia : McCallie, 1159.
- Ripley formation, Cretaceous, Georgia and Alabama : Berry, 129.
- Ripley formation, Cretaceous, Kentucky : Miller, 1293.
- Ripley formation, Cretaceous, Mississippi : Lowe, 1138, 1140.
- Ripley formation, Cretaceous, Tennessee : Schroeder, 1623 ; Wade, 1922.
- Ripton conglomerate, Algonkian, Vermont : Foye, 620.
- Riverside sandstone, Mississippian, Indiana : Logan, 1120.
- Roan gneiss, Archean, Georgia : McCallie, 1159.
- Roaring Creek sandstone, Pennsylvanian, West Virginia : Hennen, 797.
- Rochester quartzite, Vermont : Foye, 620.
- Rochester shale formation, Silurian, Ontario : Williams, 2034.
- Rociada terrane, Archeozoic, New Mexico : Keyes, 993.
- Rockcastle sandstone, Pennsylvanian, Tennessee : Butts, 258.
- Rockford limestone, Mississippian, Indiana : Logan, 1120.
- Rockhouse shale, Devonian, Tennessee : Dunbar, 525.
- Rockmart slate, Ordovician, Georgia : McCallie, 1159.
- Rockwood formation, Silurian, Georgia : McCallie, 1159.
- Rodman formation, Ordovician, Pennsylvania : Field, 590.
- Romance arkose, Vermont : Foye, 620.
- Rome formation, Cambrian, Georgia : McCallie, 1159.
- Rondout limestone, Silurian, New York : Jones, 951.
- Rosamond series, Tertiary, California : Merriam, 1264.
- Rosebud beds, Miocene, South Dakota : O'Harra, 1389.
- Rosewood, Mississippian, Kentucky : Miller, 1293.
- Rosiclare, Mississippian, Kentucky : Miller, 1293.
- Rosiclare sandstone member, Mississippian, Illinois : Weller *et al.*, 1973.
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- Ross Fork limestone, Triassic, Idaho : Mansfield, 1211, 1216.
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- Roubidoux formation, Ordovician, Missouri : Tarr, 1817.

- Round Knob shale, Pennsylvanian, Ohio: Stout, 1794.
- Rove slate, pre-Cambrian, Minnesota: Broderick, 198.
- Roxbury conglomerate series, Permo-Carboniferous, Massachusetts: Sayles, 1606.
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- Ruma formation, Mississippian, Illinois: Weller, 1974.
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- Saunich granodiorite, Jurassic (?), British Columbia: Dolmage, 506.
- Sabine formation, Tertiary, Texas: Dumble, 524.
- Sacadaga quartzite, pre-Cambrian, New York: Ailing, 28.
- Saddlehorse gypsum, Permian, Texas: Gould, 678.
- Sadlerochit sandstone, Pennsylvanian, Alaska: Leffingwell, 1074.
- St. Charles formation, Cambrian, Idaho: Mansfield, 1211.
- St. Clair limestone, Silurian, Arkansas: Miser, 1819, 1820.
- St. Clair marble, Silurian, Oklahoma: Snider, 1730.
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- St. John formation, Cretaceous, Alberta: McLearn, 1187, 1188.
- St. John formation, Cretaceous, British Columbia: Stewart, 1747.
- St. John group, Cambrian, New Brunswick: Bailey and Matthew, 52.
- St. Lawrence formation, Cambrian, Minnesota: Grout and Soper, 715.
- St. Lawrence formation, Cambrian, Wisconsin: Twenhofel and Thwaites, 1870.
- St. Lorenz limestone, Devonian, Missouri: Dake, 441.
- St. Louis formation, Mississippian, Mississippi Valley: Keyes, 999.
- St. Louis limestone, Carboniferous, Kentucky: Jillson, 918.
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- St. Louis limestone, Mississippian, Tennessee: Butts, 258; Mather, 1227.
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- St. Mary River formation, Eocene (?), Alberta: Rose, 1576.
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- St. Peter sandstone, Ordovician, Illinois: Cady, 267, 270.
- St. Peter sandstone, Ordovician, Minnesota: Grout and Soper, 715.
- St. Peter sandstone, Ordovician, Missouri: Branson, 190; Dake, 441.
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- Ste. Genevieve limestone, Carboniferous, Kentucky: Jillson, 868.
- Ste. Genevieve limestone, Mississippian, Kentucky: Butts, 259; Shaw and Mather, 1680.
- Ste. Genevieve marls, Mississippian, Iowa: Lees and Thomas, 1073.
- Ste. Genevieve stage, Mississippian, Kentucky: Miller, 1293.
- Salem limestone, Mississippian, Indiana: Logan, 1120.
- Salem limestone, Mississippian, Illinois: Coryell, 410; Nebel, 1367.
- Salem limestone (Meramecian), Mississippian, Missouri: Branson, 190.
- Salina formation, Silurian, Ontario: Williams, 2034.
- Salinas shale, Miocene, California: Kew, 980.
- Salona formation, Ordovician, Pennsylvania: Field, 590.
- Salt Lake formation, Pliocene, Idaho: Mansfield, 1216.
- Salt Lake formation, Pliocene (?), Idaho: Mansfield, 1211.
- Salt Lake formation, Tertiary, Idaho: Mansfield, 1213.
- Salt Mountain limestone, Tertiary, Alabama: Brantley, 191.
- Salt Plain shale, Permian, Kansas: Snider, 1730.
- Salt Plain shale member, Permian, Kansas: Moore, 1346.
- Salt Wash sandstone member, Jurassic, Utah: Butler, 255.
- Salzburg sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Saluda, Ordovician, Kentucky: Miller, 1293.
- Salvisa bed, Ordovician, Kentucky: Miller, 1293.
- Sample sandstone, Mississippian, Indiana: Malott, 1205.
- Sample sandstone, Mississippian, Indiana: Malott and Thompson, 1206.
- Sample sandstone member, Mississippian, Kentucky: Miller, 1293.
- Sampson Rock sandstone, Pennsylvanian, Maryland: Swartz, 1804.
- San Andrews limestone, Permian, New Mexico: Baker, 55; Semmes, 1658.

- San Angelo beds, Permian, Texas: Beede, 108.
- San Angelo formation, Permian, Texas: Beede, 109.
- San Carlos beds, Cretaceous, Texas: Udden, 1860.
- San Diego formation, Tertiary, California: Ellis, 542.
- Sandila formation, Pennsylvanian, New Mexico: Wells, 1978.
- Sandila terrane, Pennsylvanian, New Mexico: Keyes, 993.
- Sandoval terrane, Proterozoic, New Mexico: Keyes, 993.
- Sandy Huff shale, Pennsylvanian, West Virginia: Reger, 1528.
- Sangamon interglacial interval, Pleistocene: Baker, 56.
- San Juan formation, Pleistocene, Porto Rico: Maury, 1248.
- San Juan formation, Pleistocene (?), Porto Rico: Semmes, 1655.
- San Juan formation, Tertiary, Porto Rico: Berkeley, 124.
- San Juan formation, Quaternary, Porto Rico: Hubbard, 877.
- San Onofre breccia, Tertiary, California: Ellis, 542.
- San Pedro formation, Quaternary, California: Ellis, 542.
- San Sebastian shale, Tertiary, Porto Rico: Hubbard, 877.
- San Sebastian shales, Tertiary, Porto Rico: Berkeley, 124; Maury, 1248.
- Santa Fe terrane, Miocene, New Mexico: Keyes, 993.
- Santa Isabel series, Recent, Porto Rico: Hodge, 837.
- Santa Margarita formation, Miocene, California: Pack, 1415.
- Santa Rita series, Silurian, New Mexico: Keyes, 993.
- Sapello terrane, Archeozoic, New Mexico: Keyes, 993.
- Saranac series, pre-Cambrian, New York: Alling, 28.
- Sarbach formation, Ordovician, Alberta: Walcott, 1928.
- Sardis terrace, Tertiary, Mississippi: Lowe, 1138.
- Satilla formation, Quaternary, Georgia: McCally, 1159.
- Satsop formation, Pleistocene, Oregon: Smith and Packard, 1728.
- Savanna formation, Pennsylvanian, Arkansas: Miser, 1319.
- Savanna limestone, Pennsylvanian, Oklahoma: Snider, 1736.
- Sawridge formation, Cretaceous, Alberta: Allan, 20.
- Scajaquada shales, Silurian, New York: Williams, 2034.
- Scania conglomerate, Cambrian, Arizona: Ransome, 1507.
- Schooner Head series, Mount Desert Island, Maine: Bascom, 87.
- Schultz granite, Tertiary (?), Arizona: Ransome, 1507.
- Scotenville clay, Pennsylvanian, Ohio: Stout, 1794.
- Scranton shale, Pennsylvanian, Kansas: Snider, 1736.
- Scranton shale member, Pennsylvanian, Kansas: Moore, 1346.
- Selkirkian period, Proterozoic, New Mexico: Keyes, 993.
- Selma chalk, Cretaceous, Alabama: Brantley, 191.
- Selma chalk, Cretaceous, Gulf region: Berry, 129.
- Selma chalk, Cretaceous, Mississippi: Lowe, 1138, 1140.
- Selma clay, Cretaceous, Tennessee: Schroeder, 1623.
- Selma formation, Cretaceous, Tennessee: Wade, 1822.
- Seminole conglomerate, Pennsylvanian, Oklahoma: Snider, 1736.
- Senora formation, Pennsylvanian, Oklahoma: Snider, 1736.
- Sensori agglomerate and limestone, Panama and Costa Rica: MacDonald *et al.*, 1171.
- Serna terrane, Archeozoic, New Mexico: Keyes, 993.
- Sespe formation, Oligocene (?), California: Kew, 979, 980.
- Seth limestone, Pennsylvanian, West Virginia: Hennen, 797.
- Severn River limestone, Silurian, Canada: Savage and Van Tuyl, 1603.
- Severy shale, Pennsylvanian, Kansas: Snider, 1736.
- Severy shale member, Pennsylvanian, Kansas: Moore, 1346.
- Sewickley sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Sextant sandstone and shale, Devonian, Canada: Savage and Van Tuyl, 1603.
- Shady dolomite, Cambrian, Virginia: Stose *et al.*, 1786.
- Shady limestone, Cambrian, Georgia: Hull, 880; Hull *et al.*, 878; McCally, 1159.
- Shakopee dolomite, Ordovician, Illinois: Cady, 267.
- Shakopee dolomite, Ordovician, Minnesota: Grout and Soper, 715.
- Shammattawa limestone, Ordovician, Canada: Savage and Van Tuyl, 1603.
- Shannon (?) sandstone, Cretaceous, Wyoming: Hancock, 735.
- Sharon conglomerate, Pennsylvanian, Ohio: Stout, 1794.
- Sharon or Olean conglomerate, Pennsylvanian, Ohio, Pennsylvania, and New York: Decker, 483.
- Shawangunk conglomerate, Silurian, New York: Colony, 392.
- Shawnee formation, Pennsylvanian, Kansas: Moore, 1346; Snider, 1536.
- Sheep Creek beds, Miocene, South Dakota: O'Harra, 1389.

- Sheep Creek conglomerate, Carboniferous (?), Washington: Weaver, 1970.
- Sheffield formation, Devonian, Iowa: Fenton, 580.
- Sheppard granite, Tertiary, Washington: Weaver, 1970.
- Sherburne sandstone, Devonian, New York: Grabau, 685.
- Shettlerville formation, Mississippian, Illinois: Weller, 1974; Weller et al., 1973.
- Shimer gypsum member, Permian, Kansas: Moore, 1346.
- Shimer gypsum, Permian, Kansas: Snider, 1736.
- Shinarump conglomerate, Triassic, Arizona: Shimer, 1693.
- Shinarump conglomerate, Triassic, Utah: Butler, 255; Clark, 344.
- Shinarump sandstone, Permian, New Mexico: Baker, 55.
- Shinarump terrane, Triassic, New Mexico: Keyes, 993.
- Shublik formation, Triassic, Alaska: Loftingwell, 1074.
- Siberia limestone, Mississippian, Indiana: Malott and Thompson, 1206.
- Sierra terrane, Mississippian, New Mexico: Keyes, 993.
- Sierra Blanca series, Cretaceous, New Mexico: Semmes, 1658.
- Sierra de Cayey series, Comanchean or Cretaceous, Porto Rico: Hodge, 837.
- Signal Hill series, pre-Cambrian, Newfoundland: Buddington, 226.
- Sillery formation, Cambrian, Quebec: Knox, 1030.
- Silver terrane, Devonian, New Mexico: Keyes, 993.
- Silver Creek member, Devonian, Kentucky: Miller, 1293.
- Silver Hoard formation, Carboniferous, British Columbia: Schofield, 1617, 1618.
- Silvies River beds, Jurassic, Oregon: Smith and Packard, 1728.
- Simpson formation, Ordovician, Oklahoma: Decker, 483.
- Skelley limestone, Pennsylvanian, Ohio: Stout, 1794.
- Skelt shale, Pennsylvanian, West Virginia: Reger, 1528.
- Skyline formation, Carboniferous, British Columbia: Schofield, 1617, 1619.
- Slocan series, Carboniferous, British Columbia: Bancroft, 66; Schofield, 1619.
- Smithwick shale, Carboniferous, Texas: Udden, 1887.
- Smithwick shale, Mississippian, Texas: Matteson, 1231.
- Smithwick shale, Pennsylvanian, Texas: Girty, 659; Girty and Moore, 660; Moore, 1344; Plummer, 1475; Snider, 1736.
- Smoky Hill chalk member, Cretaceous, Kansas: Moore, 1346.
- Smoky River formation, Cretaceous, Alberta: McLearn, 1187, 1188.
- Smoky River formation, Cretaceous, British Columbia: Stewart, 1767.
- Smoky River series, Cretaceous, British Columbia: Stewart, 1767.
- Snider Creek shale, Devonian, Missouri: Brannon, 190.
- Socorran series, Mississippian, New Mexico: Keyes, 993.
- Soledad deposits, Tertiary, California: Jordan, 954.
- Solitario terrane, Archeozoic, New Mexico: Keyes, 993.
- Sooke formation, Miocene, British Columbia: Cooke, 402.
- Sooke gabbro, Oligocene, British Columbia: Cooke, 402.
- Sooke gabbro, Tertiary, British Columbia: Dolmage, 507.
- Spavinaw granite, Oklahoma: Aurin, 59.
- Spearfish formation, Triassic (?), Wyoming: Hancock, 785.
- Spence shale member, Cambrian, Idaho: Mansfield, 1211.
- Spergen, Mississippian, Kentucky: Miller, 1293.
- Spergen formation, Mississippian, Illinois: Hinds, 832.
- Spring Creek clays, Cretaceous, Kansas: Twenhofel, 1871.
- Springville shale, Devonian, Illinois: Savage, 1604.
- Squantum tillite member, Permo-Carboniferous, Massachusetts: Sayles, 1606.
- Stanley shale, Mississippian, Arkansas: Miser, 1319.
- Stanton limestone, Pennsylvanian, Kansas: Boughton, 170; Snider, 1736.
- Stanton limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Star limestone, Carboniferous, British Columbia: Schofield, 1619.
- Steele shale, Cretaceous, Wyoming: Collier, 888.
- Stensgar dolomite, Paleozoic, Washington: Weaver, 1970.
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- Stockton (Cannelton) limestone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Stollmeyer Cruse shale, Tertiary, Trinidad: Macready, 1195.
- Stollmeyer oil zone, Tertiary, Trinidad: Macready, 1195.
- Stonebreaker limestone, Pennsylvanian, Oklahoma: Bowen et al., 172; Heald, 779; Snider, 1736.
- Stonchenge member, Ordovician, Maryland: Bassler, 90.
- Stones River group, Ordovician, Pennsylvania: Field, 590.
- Stones River group, Ordovician, Tennessee: Galloway, 633.
- Stones River limestone, Ordovician, Maryland: Bassler, 90.

- Strawn division, Pennsylvanian, Texas: Plummer, 1475.
- Strawn formation, Pennsylvanian, Texas: Matteson, 1281; Snider, 1786.
- Stuart shale, Pennsylvanian, Oklahoma: Snider, 1786.
- Stump sandstone, Jurassic, Idaho: Mansfield, 1214, 1216.
- Sturgeon formation, pre-Cambrian, Michigan: Allen, 25.
- Sucarnochee formation, Tertiary, Alabama: Brantley, 191.
- Sullivan formation, Cambrian, Alberta: Walcott, 1928.
- Summerfield limestone, Pennsylvanian, Ohio: Stout, 1794.
- Summit series, Idaho, Washington, and British Columbia: Weaver, 1970.
- Summitville andesite, Tertiary, Colorado: Patton, 1444.
- Sumner group, Carboniferous, Kansas: Darton, 462.
- Sunbury shale, Mississippian, Kentucky: Miller, 1293.
- Sundance formation, Jurassic, Colorado: Lee, 1067.
- Sundance formation, Jurassic, Wyoming: Collier, 389; Hancock, 735.
- Sundance marine beds, Jurassic, Colorado: Henderson, 795.
- Sunday Lake quartzite, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Sunderland formation, Quaternary, Maryland: Hay, 767.
- Sunderland formation, Quaternary, Maryland and Delaware: Bascom and Miller, 86.
- Sunloch metagabbro, Tertiary, British Columbia: Dolmage, 507.
- Supai formation, Pennsylvanian and Permian, Arizona: Shimer, 1693.
- Superioran period, Proterozoic, New Mexico: Keyes, 993.
- Sutton formation, Triassic or Jurassic, British Columbia: Dolmage, 506.
- Swan Peak quartzite, Ordovician, Idaho: Mansfield, 1211.
- Swansea rhyolite, Utah: Lindgren and Loughlin, 1105.
- Swede Pond quartzite, pre-Cambrian, New York: Ailing, 28.
- Sweetland Creek shale, Devonian, Illinois: Savage, 1604.
- Sycamore limestone, Mississippian, Oklahoma: Decker, 483.
- Sylamore sandstone, Mississippian, Missouri: Branson, 190.
- Sylamore sandstone member, Devonian, Arkansas: Miser, 1319.
- Sylvan shale, Silurian, Oklahoma: Decker, 483.
- Tabera formation, Oligocene, Dominican Republic: Cooke, 400.
- Talbot formation, Quaternary, Maryland: Hay, 767.
- Talbot formation, Quaternary, Maryland, Delaware, and New Jersey: Bascom and Miller, 86.
- Tallahatta buhrstone, Tertiary, Alabama: Brantley, 191.
- Tallahatta formation, Tertiary, Mississippi: Lowe, 1138.
- Tampa formation, Oligocene, Florida: Cushman, 481; Sellards, 1647, 1648.
- Taneytown facies of Newark system, Triassic, Maryland: Dorsey, 510.
- Taosan series, Archeozoic, New Mexico: Keyes, 993.
- Tarkio formation, Carboniferous, Iowa: Smith, 1714.
- Tar Springs, Mississippian, Kentucky: Miller, 1293.
- Tar Springs formation, Mississippian, Indiana: Malott and Thompson, 1206.
- Tar Springs sandstone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1973.
- Tatina group, Ordovician (?), Alaska: Capps, 291.
- Taylor formation, Cretaceous, Texas: Dumble, 524; Sellards, 1650, 1653; Shuler, 1696; Snider, 1736.
- Taylor marl, Cretaceous, Texas: Udden, 1880.
- Tenpot Mountain porphyry, Arizona: Ransome, 1507.
- Tecovas formation, Triassic, Texas: Gould, 678.
- Tecovas terrane, Triassic, New Mexico: Keyes, 993.
- Tecuja beds, Tertiary, California: Stock, 1770.
- Tecumseh shale, Pennsylvanian, Kansas: Snider, 1736.
- Tecumseh shale member, Pennsylvanian, Kansas: Moore, 1346.
- Tejon formation, Eocene, California: Kew, 979, 980.
- Tejon formation, Eocene, California: Pack, 1415.
- Telleria terrane, Permian, New Mexico: Keyes, 993.
- Temiskaming series, pre-Cambrian, Ontario: Whitehead, 2010.
- Tensleep sandstone, Carboniferous, Wyoming: Collier, 389.
- Tensleep sandstone, Pennsylvanian, Wyoming: Schultz, 1639.
- Terry limestone, Mississippian, West Virginia: Hennen, 797; Reger, 1528.
- Tessey formation, Permo-Carboniferous, Texas: Bose, 161.
- Teutonic limestone, Cambrian, Utah: Lindgren and Loughlin, 1105; Wichman, 2024.
- Thaynes group, Triassic, Idaho: Mansfield, 1211, 1214, 1216.
- Thebes sandstone, Ordovician, Illinois and Missouri: Savage, 1602.
- Thebes sandstone, Ordovician, Missouri: Dake, 441.

- Theresa mixed beds, Cambrian, New York: Chadwick, 310.
- Thermopolis shale, Cretaceous, Wyoming: Collier, 389.
- Theiford series, post-Ordovician, Quebec: Knox, 1030.
- Thornton clay, Pennsylvanian, Ohio: Stout, 1794.
- Thornton fire clay, Pennsylvanian, West Virginia: Reger, 1528.
- Thorold sandstone member, Silurian, Ontario: Williams, 2084.
- Threeforks formation, Devonian, Montana: Condit, 395.
- Threeforks (?) limestone, Devonian, Idaho: Mansfield, 1211.
- Thurman sandstone, Pennsylvanian, Oklahoma: Snider, 1736.
- Tigre limestone, Oligocene, Panama and Costa Rica: MacDonald *et al.*, 1171.
- Tijeras terrane, Proterozoic, New Mexico: Keyes, 993.
- Timiskamian, pre-Cambrian, Ontario: Miller and Knight, 1301, 1302.
- Timiskaming series, pre-Cambrian, Canada: Cooke, 407.
- Timiskaming series, pre-Cambrian, Ontario: Burrows and Hopkins, 246.
- Timpas limestone, Cretaceous, New Mexico: Garrett, 640.
- Timpas terrane, Cretaceous, New Mexico: Keyes, 993.
- Timothy sandstone, Triassic, Idaho: Mansfield, 1211, 1214, 1216.
- Tiute quartzite, Cambrian, Utah: Lindgren and Loughlin, 1105: Wichman, 2024.
- Tinton member, Cretaceous, New Jersey: Mansfield, 1210.
- Tionesta clay, Pennsylvanian, Ohio: Stout, 1794.
- Tionesta (Homewood) sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Tippah sandstone (Crainesville of Harris), Tertiary, Mississippi: Lowe, 1138.
- Tipton shale member, Tertiary, Wyoming: Schultz, 1639.
- Todilto (?) formation, Jurassic, Utah: Clark, 344.
- Toklo sand member, Cretaceous, Arkansas: Miser, 1319.
- Toledo formation, Oligocene, Oregon: Harrison and Eaton, 761.
- Tombigbee sand, Cretaceous, Tennessee: Wade, 1922.
- Tomstown limestone, Cambrian, Maryland: Bassler, 90.
- Tonzona group, Devonian or Silurian, Alaska: Capps, 291.
- Topeka limestone, Pennsylvanian, Kansas: Snider, 1736.
- Topeka limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Torbay series, pre-Cambrian, Newfoundland: Buddington, 226.
- Tornado limestone, Carboniferous, Arizona: Ransome, 1507.
- Tornillo clays, Cretaceous, Texas: Udden, 1880.
- Toro formation Miocene, Panama and Costa Rica: MacDonald *et al.*, 1171.
- Toro limestone, Pliocene, Panama, Canal Zone: MacDonald, 1170, Vaughan, 1919.
- Toronto formation, Pleistocene, Ontario: Baker, 56.
- Torpedo sandstone, Carboniferous, Oklahoma: Hopkins and Powers, 854.
- Torpedo (?) sandstone, Pennsylvanian, Oklahoma: Goldman and Robinson, 667.
- Torrance terrane, Permian, New Mexico: Keyes, 993.
- Torrejon terrane, Eocene, New Mexico: Keyes, 993.
- Totatlanika schist, Devonian or Silurian, Alaska: Capps, 291.
- Towanda bed, Permian, Kansas: Moore, 1346.
- Tow Creek sandstone, Cretaceous, Colorado: Crawford *et al.*, 416.
- Traders members, pre-Cambrian, Michigan: Allen, 25.
- Tradewater formation, Pennsylvanian, Illinois: Weller *et al.*, 1973.
- Travester terrane, Jurassic, New Mexico: Keyes, 993.
- Travis Peak sand, Cretaceous, Texas: Dumble, 524.
- Travis Peak formation, Cretaceous, Texas: Sellards, 1653; Snider, 1736.
- Treasure Mountain latite, Tertiary, Colorado: Patton, 1454.
- Trenton group, Ordovician, Tennessee: Galloway, 633.
- Trenton limestone, Ordovician, Indiana: Logan, 1120.
- Trenton limestone, Ordovician, New York: Chadwick, 310; Clark, 345; Decker, 483.
- Trinidad formation, Cretaceous, Colorado: Henderson, 794.
- Trinidad sandstone, Cretaceous, New Mexico: Garrett, 640.
- Trinity, Cretaceous, Texas: Dumble, 524.
- Trinity conglomerate, Comanchean, Texas: Liddle and Prettyman, 1102.
- Trinity division, Comanchean, Texas: Liddle and Prettyman, 1102; Snider, 1736.
- Trinity division, Cretaceous, Texas: Winton and Adkins, 2062.
- Trinity formation, Cretaceous, Arkansas: Miser, 1319.
- Trinity sand, Cretaceous, Texas: Udden, 1880.
- Trinity sands, Cretaceous, Texas: Materson, 1231.
- Trout Creek sandstone, Cretaceous, Colorado: Crawford *et al.*, 416.
- Trout Pond limestone, pre-Cambrian, New York: Alling, 28.
- Troy quartzite, Cambrian, Arizona: Ransome, 1507.
- Truchas terrane, Archeozoic, New Mexico: Keyes, 993.
- Trujillo formation, Triassic, Texas: Gould, 678.

- Trujillo terrane, Triassic, New Mexico:** Keyes, 993.
Trujillo Alta limestone, Porto Rico: Berkeley, 124.
Tully pyrite layer, Devonian, New York: Hussakof and Bryant, 984.
Turkey Run limestone, Pennsylvanian, Oklahoma: Bowen *et al.*, 172; Heald, 779; Heald and Mather, 780.
Tuscaloosa formation, Tertiary, Alabama: Brantley, 191.
Tuscaloosa formation, Cretaceous, Alabama: Brantley, 191.
Tuscaloosa formation, Cretaceous, Alabama and Tennessee: Berry, 129.
Tuscaloosa formation, Cretaceous, Mississippi: Lowe, 1138, 1140.
Tuscaloosa formation, Cretaceous, Tennessee: Wade, 1922.
Tusculum limestone, Mississippian, Mississippi: Lowe, 1138.
Tusculum quartzite, Cambrian, Georgia: McCallie, 1159.
Twentymile sandstone, Cretaceous, Colorado: Crawford *et al.*, 416.
Twiggs clay member, Tertiary, Georgia: McCallie, 1159.
Twin Creek limestone, Jurassic, Idaho: Mansfield, 1216.
Twin Creek formation, Jurassic, Wyoming: Schultz, 1639.
Twin Creek limestone, Jurassic, Idaho: Mansfield, 1211, 1214.
Twin Lakes porphyry, Mesozoic, Colorado: Howell, 874.
Tyee formation, Eocene, Oregon: Harrison and Eaton, 761.
Tyee sandstone, Eocene, Oregon: Smith and Packard, 1728.
Tygee sandstone, Cretaceous (?), Idaho: Mansfield, 1216.
Tyler graywacke slate, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
Tyler slate formation, pre-Cambrian, Wisconsin: Allen, 25.
Tyner formation, Ordovician, Oklahoma: Snider, 1736.
Tyrone substage, Ordovician, Kentucky: Miller, 1293.
Uniontown shale, Pennsylvanian, West Virginia: Reger, 1528.
Ulsterian group, Devonian, Tennessee: Dunbar, 525.
Ultima Thule member, Cretaceous, Arkansas: Miser, 1319.
Umpqua formation, Eocene, Oregon: Harrison and Eaton, 761.
Umpqua group, Eocene, Oregon: Smith and Packard, 1728.
Unlona shale, Cretaceous (?), Porto Rico: Semmes, 1635.
Unicoi formation, Cambrian, Virginia: Stose *et al.*, 1786.
Uniontown limestone, Pennsylvanian, Ohio: Stout, 1794.
University terrace, Pleistocene, Alabama: Brantley, 191.
Ute formation, Cambrian, Idaho: Mansfield, 1211.
Uvalde formation, Pliocene or Pleistocene, Texas: Sellards, 1653.
Valdez group, Mesozoic (?), Alaska: Johnson, 930.
Vale formation, Permian, Texas: Beede, 109.
Valencian series, Proterozoic, New Mexico: Keyes, 993.
Valentine formation, Ordovician, Pennsylvania: Field, 590.
Valley Spring gneiss, pre-Cambrian, Texas: Snider, 1736.
Valleytown formation, Cambrian, Georgia: McCallie, 1159.
Valverde clay, Miocene, Dominican Republic: Cooke, 400.
Vancouver group, Jurassic or Triassic, British Columbia: Dolmage, 506.
Vandever shale, Pennsylvanian, Tennessee: Butts, 258.
Vanport limestone, Pennsylvanian, Ohio: Stout, 1794.
Vanport (ferriferous) limestone, Pennsylvanian, West Virginia: Reger, 1528.
Vaqueros formation, Tertiary, California: Pack, 1415.
Vaqueros sandstone, Miocene, California: Kew, 979, 980.
Vauriel formation, Anticosti, Quebec: Twenhofel, 1873.
Veale sand, Mississippian, Texas: Matteson, 1231.
Vermejo formation, Cretaceous, New Mexico: Garrett, 640.
Vermillion Cliff sandstone, Triassic, Utah: Butler, 255.
Vermillionville sandstone, Carboniferous, Illinois: Cady, 267.
Vicksburg formation, Oligocene, Florida: Sellards, 1647.
Vicksburg formation, Tertiary, Florida: Sellards, 1648.
Vicksburg formation, Tertiary, Mississippi: Lowe, 1140.
Vicksburg group, Tertiary, Alabama: Brantley, 191.
Vicksburg group, Tertiary, Mississippi: Lowe, 1138.
Victoria quartzite, Mississippian, Utah: Lindgren and Loughlin, 1105.
Vidrio formation, Permian-Carboniferous, Texas: Böse, 161.
Vienna limestone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1973.
Vilas shale, Pennsylvanian, Kansas: Boughton, 170; Snider, 1736.
Vilas shale member, Pennsylvanian, Kansas: Moore, 1346.
Vinton, Mississippian, Ohio: Miller, 1293.
Vinton phase of Otis limestone, Devonian, Iowa: Norton, 1381.
Viola limestone, Ordovician, Oklahoma: Decker, 483.
Virginia slate, pre-Cambrian, Minnesota: Grout and Broderick, 716.

- Vulcan formation, pre-Cambrian, Michigan: Allen, 25.
- Wabauense formation, Pennsylvanian, Kansas: Moore, 1346; Snider, 1736.
- Wabi formation, Silurian, Ontario: Hume, 931.
- Waco, Silurian, Kentucky: Miller, 1293.
- Waits River limestone, Ordovician, Vermont: Richardson, 1544, 1545.
- Walden sandstone, Carboniferous, Georgia: McCallie, 1159.
- Waldrip formation, Pennsylvanian, Texas: Plummer, 1475.
- Waldrip limestone, Pennsylvanian, Texas: Snider, 1736.
- Waldron formation, Silurian, Tennessee: Mather, 1227.
- Waldron shale, Silurian, Kentucky: Miller, 1293.
- Wallace formation, Algonkian, Idaho: Jones, 944.
- Walnut clay, Comanchean, Texas: Liddle and Prettyman, 1102.
- Walnut clays, Cretaceous, Texas: Dumble, 524; Snider, 1736.
- Walnut formation, Cretaceous, Texas: Adkins and Winton, 7.
- Walnut limestone, Cretaceous, Texas: Christner and Wheeler, 359.
- Walnut shale, Pennsylvanian, Kansas: 1736.
- Walnut shell conglomerate, Cretaceous, Texas: Winton and Adkins, 2062.
- Waltersburg sandstone, Mississippian, Illinois: Weller, 1974, 1975; Weller *et al.*, 1973.
- Wamsutta series, Carboniferous, Rhode Island: Perkins, 1462.
- Wapanucka limestone, Pennsylvanian, Oklahoma: Snider, 1736.
- Wapiti formation, Cretaceous, Alberta: McLearn, 1187.
- Wapsipinicon limestone, Devonian, Illinois and Iowa: Savage, 1604.
- Wapsipinicon stage, Devonian, Iowa: Norton, 1381.
- War Eagle (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Warrendale formation, Miocene, Oregon: Smith and Packard, 1728.
- Warsaw formation, Mississippian, Illinois: Coryell, 410; Hinds, 832; Nebel, 1367.
- Warsaw formation, Mississippian, Kentucky: Butts, 259.
- Warsaw formation, Mississippian, Tennessee: Butts, 258; Mather, 1227.
- Warsaw limestone, Mississippian, Illinois: Weller *et al.*, 1973.
- Warsaw limestone, Mississippian, Kentucky: Miller, 1297; Shaw and Mather, 1630.
- Warsaw stage, Mississippian, Kentucky: Miller, 1293.
- Wasatch formation, Tertiary, Idaho: Mansfield, 1213, 1216.
- Wasatch formation, Tertiary, Wyoming: Schultz, 1639.
- Washington formation, Permian, Ohio: Stauffer and Schroyer, 1757; Stout, 1794.
- Washington phase of Waits River limestone: Richardson, 1544, 1545.
- Washington (Lower) limestone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Washington (Middle) limestone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Washington (Upper) limestone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Washita division, Comanchean, Texas: Snider, 1736.
- Washita division, Cretaceous, Texas: Winton and Adkins, 2062.
- Washita formation, Cretaceous, Texas: Adkins and Winton, 7.
- Washita group, Cretaceous, Arkansas: Miser, 1819.
- Washita group, Cretaceous, Texas: Dumble, 524.
- Washita limestone, Cretaceous, Texas: Dumble, 524.
- Washita terrane, Comanchean, New Mexico: Keyes, 993.
- Watauga shale, Cambrian, Virginia: Stose *et al.*, 1786.
- Watsi shale, Oligocene, Panama and Costa Rica: MacDonald *et al.*, 1171.
- Wautubbe marls, Tertiary, Mississippi: Lowe, 1138.
- Waverlian series, Mississippian, Kentucky: Miller, 1293.
- Waverly group, Carboniferous, Kentucky: Jillson, 918.
- Wayan formation, Cretaceous, Idaho: Mansfield, 1216.
- Waynesboro formation, Cambrian, Maryland: Bassler, 90.
- Waynesburg limestone, Pennsylvanian, Ohio: Stout, 1794.
- Waynesburg sandstone, Permian, Ohio: Schroyer, 1757; Stout, 1794.
- Waynesville, Ordovician, Kentucky: Miller, 1293.
- Wayside sand, Pennsylvanian, Kansas: Boughton, 170.
- Webster Spring sandstone, Mississippian, West Virginia: Reger, 1528.
- Welser sand, Pennsylvanian, Kansas: Boughton, 170.
- Welsner quartzite, Cambrian, Georgia: Hull, 880; Hull *et al.*, 878; McCallie, 1159.
- Wekusko group, pre-Cambrian, Manitoba: Alcock, 10.
- Wekusko series, pre-Cambrian, Manitoba: Alcock, 10.
- Welch sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Welborn beds, Tertiary, Texas: Dumble, 524.
- Wellington formation, Permian, Kansas: Moore, 1346; Snider, 1736.

- Wells formation, Pennsylvanian, Idaho: Mansfield, 1211, 1216.
- Weno formation, Comanchean, Texas: Adkins, 6; Adkins and Winton, 7; Winton and Adkins, 2062.
- Westerville limestone, Pennsylvanian, Iowa: Tilton, 1846.
- Westfield phase of Otis limestone, Devonian, Iowa: Norton, 1381.
- Weston shale, Pennsylvanian, Kansas: Boughton, 170; Snider, 1736.
- Weston shale member, Pennsylvanian, Kansas: Moore, 1346.
- West River formation, Devonian, New York: Hussakof and Bryant, 884.
- West Union formation, Silurian, Ohio: Foerste, 598, 599.
- Wetumka shale, Pennsylvanian, Oklahoma: Snider, 1736.
- Weverton sandstone, Cambrian, Maryland: Bassler, 90.
- Wewoka shale, Pennsylvanian, Oklahoma: Snider, 1736.
- Whirlpool sandstone member, Silurian, Ontario: Williams, 2034.
- White Cliff sandstone, Jurassic, Utah: Butler, 255.
- Whiteface anorthosite, pre-Cambrian, New York: Miller, 1303, 1304.
- Whitehorse sandstone, Permian, Kansas: Snider, 1736.
- Whitehorse sandstone, Permian, Oklahoma: Clapp, 340.
- Whitehorse sandstone member, Permian, Kansas: Moore, 1346.
- White River formation, Tertiary, North Dakota: Leonard, 1082.
- White River formation, Tertiary, Wyoming: Collier, 388; Hancock, 735.
- Whiterock formation, Nova Scotia: Faribault, 572.
- Whitetail conglomerate, Tertiary, Arizona: Ransome, 1507.
- Wichita formation, Permian, Texas: Materson, 1231.
- Wicomico formation, Quaternary, Maryland: Hay, 767.
- Wicomico formation, Quaternary, Maryland and Delaware: Bascom and Miller, 86.
- Wilberns formation, Cambrian, Texas: Snider, 1736.
- Wilcox formation, Eocene, Texas: De Golyer, 485; Sellards, 1653.
- Wilcox formation, Tertiary, Georgia: McCallie, 1159.
- Wilcox formation, Tertiary, Mississippi: Lowe, 1140.
- Wilcox formation, Tertiary, Texas: Dumble, 524; Udden, 1880.
- Wilcox group, Eocene, Texas: Snider, 1736.
- Wilcox group, Tertiary, Alabama: Brantley, 191.
- Wilcox group, Tertiary, Mississippi: Lowe, 1138.
- Willhite slate, Algonkian, Georgia: Hull, 980.
- Willard shale, Pennsylvanian, Kansas: Snider, 1736.
- Willard shale member, Pennsylvanian, Kansas: Moore, 1346.
- Williamson sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Williamson shale member, Silurian, Ontario: Williams, 2034.
- Williamsville bed, Silurian, New York: Williams, 2034.
- Willow Creek beds, Tertiary, Alberta: Slipper, 1712.
- Willow Creek formation, Eocene, Alberta: Stewart, 1766.
- Wilson formation, Pennsylvanian, Oklahoma: Snider, 1736.
- Wind River formation, Tertiary, Wyoming: Collier, 388, 389.
- Windrow formation, upper Mississippi Valley: Thwaites and Twenhofel, 1843.
- Windsor series, Mississippian, Nova Scotia: Hayes, 772.
- Winfield limestone, Permian, Kansas: Snider, 1736.
- Winfield limestone, Permian, Oklahoma: Bowen *et al.*, 172.
- Winfield limestone member, Permian, Kansas: Moore, 1346.
- Wingate sandstone, Jurassic, New Mexico: Lee, 1063.
- Wingate sandstone, Jurassic, Utah: Clark, 344.
- Wingate terrane, Triassic, New Mexico: Keyes, 993.
- Winifrede limestone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Winifrede (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Winifrede (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Winona sand, Tertiary, Mississippi: Lowe, 1138.
- Winslow formation, Pennsylvanian, Arkansas: Miser, 1319.
- Winslow formation, Pennsylvanian, Oklahoma: Bloesch, 155.
- Winterset limestone, Pennsylvanian, Iowa: Tilton, 1846.
- Winterset limestone, Pennsylvanian, Kansas: Snider, 1736.
- Winterset limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Wisconsin drift, Pleistocene: Baker, 56.
- Wisconsin drift, Pleistocene, Minnesota: Sardeson, 1600.
- Wisconsin glacial stage, Quaternary, Ohio: Stout, 1794.
- Wissahickon mica gneiss, pre-Cambrian, Maryland and Pennsylvania: Bascom and Miller, 86.
- Wolfcamp formation, Permo-Carboniferous, Texas: Böse, 161.
- Womble shale, Ordovician, Arkansas: Miser, 1319.

- Wood shale, Triassic (?), Idaho: Mansfield, 1211, 1214, 1216.
- Woodbine formation, Cretaceous, Texas: Dumble, 524; Shuler, 1696; Snider, 1736; Udden, 1880; Winton and Adkins, 2062.
- Woodburn bed, Ordovician, Kentucky: Miller, 1293.
- Woodford chert, Devonian, Oklahoma: Decker, 483.
- Wood's Bluff formation, Tertiary, Mississippi: Lowe, 1138.
- Woodside shale, Triassic, Idaho: Mansfield, 1211, 1214, 1216.
- Woodward formation, Permian, Kansas: Moore, 1346; Snider, 1736.
- Word formation, Carboniferous, Texas: Beede, 111.
- Word formation, Permo-Carboniferous, Texas: Böse, 161.
- Wreck Bay formation, Pleistocene (?), British Columbia: Dolmage, 506.
- Wreford limestone, Permian, Kansas and Oklahoma: Snider, 1736.
- Wreford limestone, Permian, Oklahoma: Bowman *et al.*, 172.
- Wreford limestone member, Carboniferous, Kansas and Oklahoma: Twenhofel, 1867.
- Wreford limestone member, Permian, Kansas: Moore, 1346.
- Wynona sandstone, Pennsylvanian, Oklahoma: Heald and Bowen, 778.
- Yale member, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 915.
- Yankeetown chert, Mississippian, Illinois: Weller, 1974.
- Yaque group, Miocene, Dominican Republic: Cooke, 400.
- Yaquina formation, Oligocene, Oregon: Harrison and Eaton, 761.
- Yarmouth (?) sand and soil, Pleistocene, Illinois: Hinds, 832.
- Yarmouth stage, Pleistocene, Iowa: Tilton, 1846, 1847.
- Yarmouth interglacial interval, Pleistocene: Baker, 56.
- Yazoo clays, Tertiary, Mississippi: Lowe, 1138.
- Yegua clay, Tertiary, Texas: Udden, 1880.
- Yegua formation, Eocene, Texas: Snider, 1736.
- Yegua formation, Tertiary, Texas: Dumble, 524.
- Yellow Creek beds, Devonian, Mississippi: Lowe, 1138.
- Yeso formation, Pennsylvanian, New Mexico, Semmes, 1658.
- Yeso formation, Permian, New Mexico: Baker, 55.
- Yeso terrane, Permian, New Mexico: Keyes, 993.
- Ysidro terrane, Proterozoic, New Mexico: Keyes, 993.
- Zoar (Lower Mercer) limestone, Pennsylvanian, Ohio: Stout, 1794.
- Zunian series, Jurassic, New Mexico: Keyes, 993.



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